

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 January 2002 (31.01.2002)

PCT

(10) International Publication Number
WO 02/07780 A2

(51) International Patent Classification⁷: A61K 49/00, 47/48

Babauta Road, San Diego, CA 92129 (US). **CATHERS, Brian, E.** [US/US]; 13041 Avenida Del General, San Diego, CA 92129 (US). **SERGEEVA, Maria, V.** [RU/US]; 11338 W. San Raphael Drive, San Diego, CA 92130 (US).

(21) International Application Number: PCT/US01/23095

(22) International Filing Date: 20 July 2001 (20.07.2001)

(74) Agent: **KONSKI, Antoinette, F.**; McCutchen, Doyle, Brown & Enerson, LLP, Three Embarcadero Center, San Francisco, CA 94111 (US).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/219,598 20 July 2000 (20.07.2000) US
60/244,953 1 November 2000 (01.11.2000) US
60/276,728 16 March 2001 (16.03.2001) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(71) Applicant (*for all designated States except US*): **NEW-BIOTICS, INC.** [US/US]; Suite E, 11760 Sorrento Valley Road, San Diego, CA 92121 (US).

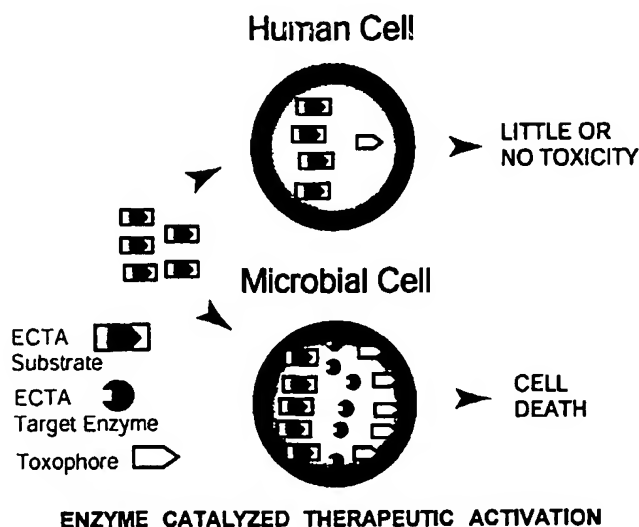
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **SHEPARD, Michael, H.** [US/US]; 1256 Quail Garden Court, Encinitas, CA 92024 (US). **LACKEY, David, B.** [US/US]; 9496

[Continued on next page]

(54) Title: METHODS FOR IDENTIFYING THERAPEUTIC TARGETS FOR TREATING INFECTIOUS DISEASE



ECTA technology utilizes preferentially expressed enzymes in pathogenic organisms to generate cytotoxins.

(57) Abstract: This invention provides methods and systems to identify enzymes that act as enzyme catalyzed therapeutic activators and the enzymes identified by these methods. Also provided by this invention are compounds activated by the enzymes as well as compositions containing these compounds.

WO 02/07780 A2



Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHODS FOR IDENTIFYING THERAPEUTIC TARGETS FOR TREATING INFECTIOUS DISEASE

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application claims the benefit under 35 U.S.C. § 119(e) of U.S. provisional patent applications having the serial numbers 60/219,598; 60/244,953; and 60/276,728, filed July 20, 2000; November 1, 2000; and March 16, 2001, respectively. The contents of these applications are hereby incorporated by reference into the present disclosure.

10

TECHNICAL FIELD

 The present invention relates to the field of Enzyme Catalyzed Therapeutic Activation (ECTA™) therapy and in particular, ECTA therapies targeting intrinsic and unique enzymes in pathogenic microorganisms or in
15 host cells.

BACKGROUND OF THE INVENTION

 Throughout and within this disclosure, various publications, patents, published patent applications and references are identified by first author and date, within parentheses, patent number, publication number or by web
20 address. If the complete bibliographic citation is not provided after the publication or reference, it is at the end of the specification, immediately preceding the claims. The disclosures of all publications, references and information provided at the web addresses are hereby incorporated by reference into this disclosure to more fully describe the state of the art to
25 which this invention pertains.

 The resistance of bacterial, fungal, and viral pathogens to drug therapy has become a health issue of global concern. Similarly, the resistance of cancer cells to chemotherapy is responsible for about 600,000 deaths each year in the United States. While there are important differences that
30 distinguish these different diseases, there are also important unifying concepts. For this reason, the introduction to this patent application will

focus on bacterial drug resistance mechanisms, and refer to common issues with other diseases as appropriate.

When antibiotics became widely available in the middle of the twentieth century (approximately 50 years ago), they were hailed as miracle drugs--magic bullets able to eliminate bacterial infection without harm to the normal cells of treated individuals. Yet with each passing decade, drug-resistant bacteria and other drug-resistant pathogens have emerged with increasing frequency. Simple bacterial and fungal infections that were once eliminated with a single drug and a simple course of therapy have become life threatening, and can be successfully treated only with drugs that display significant toxicity. Similarly, the tremendous optimism that followed initial clinical use of protease and reverse transcriptase inhibitors in the treatment of human immunodeficiency disease has now been replaced with complex cocktails of agents, and the understanding that resistant strains of virus will develop (Armstrong and Cohen (1999)).

An important reason why resistance has continued to develop at such a rapid rate, in all fields of infectious disease, is that the discovery and development of antibiotics has focused on only a few targets and a few mechanisms. By far the most common approach to discovery of anti-infectives has been the search for inhibitors of bacterial, fungal or viral enzyme functions. Antibiotics to treat the most common bacterial infections attack only a few distinct targets in the pathogen (Neu (1992)). For example, beta-lactams, penicillins, cephalosporins, monobactams, carbapenems, and penems are Class I inhibitors of bacterial cell wall synthesis. The glycopeptides vancomycin and teicoplanin are examples of Class II inhibitors of cell wall synthesis. Clindamycin, chloramphenicol, tetracyclines, and aminoglycosides are examples of known inhibitors of protein synthesis. Ciprofloxacin and ofloxacin are known inhibitors of DNA gyrase.

Each of these drugs targets an important enzyme. For difficult infections, combinations of these and other drugs are often utilized. However, the combination of drugs often works toward inhibition of separate

enzyme targets. For instance, in bacterial and sometimes fungal infections, the combination of trimethoprim and sulfamethoxazole is used to simultaneously inhibit dihydrofolate reductase and dihydroopterate synthetase, respectively. Similar approaches are used for the treatment of viral infections and cancer. In anti-HIV therapy the combination of reverse transcriptase and viral protease inhibitors is commonly employed. In treatment of breast cancer, cocktails that include a fluoropyrimidine and methotrexate, inhibitors of thymidylate synthase and dihydrofolate reductase, respectively, are often used.

It can therefore be seen that inhibitors of enzyme function are favored for the development of drug treatments in cancer and infectious disease. However, this approach has led to the emergence of drug resistant strains that render the original therapeutic ineffective. Antimicrobial agents are rendered inactive by four major mechanisms (Reviewed in Schmitz and Fluit (1999)):

(I). Enzyme mediated. This is the most common inactivation scheme observed in laboratory and clinical bacterial strains. For example, beta-lactam antibiotics work by inhibiting cell wall synthesis, specifically they inhibit penicillin binding protein. In some cases though, bacteria express a beta-lactamase enzyme which hydrolyses the antibiotics so they become inactive. Bacteria that express a beta-lactamase are often beta-lactam-antibiotic resistant. Pathogens can also enzymatically modify a therapeutic so that it cannot bind to its target (as seen with aminoglycosides and chloramphenicol). In both of the cases outlined above, an enzyme encoded by the pathogen mediates resistance.

(II). Membrane permeability. Pathogens adapt and change their cell wall (the porin structures) to prevent drug entry. This can occur in response to almost any antibacterial agent.

(III). Drug efflux pumps. Pathogens adapt and change membrane transport proteins (also an enzyme family), such that they operate with increased efficiency toward the antibiotic. This is an important mechanism of resistance to tetracycline.

(IV). Target mutation. Pathogens mutate the therapeutic target thereby preventing activation of the antibiotic. Common mutations occur in the penicillin binding protein, which prevents activation of the antibiotic.

In the hospital setting, the most recent worrisome resistance traits to
5 emerge include plasmid-mediated resistance to imipenem and to third-generation cephalosporins among nosocomial gram-negative bacteria, and the acquisition of resistance to vancomycin by enterococci. Methicillin-resistant staphylococci continue to be a problem, with about 75% of clinical strains found to be resistant to the penicillin-related drugs, and increasingly
10 resistant to numerous other agents. The most important resistance traits seen in community-acquired organisms include beta-lactam resistance in *Streptococcus pneumoniae* and combined ampicillin and chloramphenicol resistance in *Haemophilus influenzae*. Shigellae resistant to essentially all commonly used oral agents are also a problem, particularly in developing
15 countries (Reviewed by Murray, B. (1997)).

While there are important differences in the exact mechanisms of drug resistance between bacterial, fungal and viral pathogens, a common theme is present throughout. Most commonly, enzyme inhibitors are selected for drug development and use in the clinic. Similarly, inhibitors of enzyme function
20 are commonly used in the treatment of cancer (McVie (1999)). In each of these cases, drug resistance is characterized by increased enzyme expression, mutation of the target enzyme (so that it no longer recognizes the inhibitor), changes in target cell permeability and the development or overexpression of efflux pumps. There is no end in sight to the problem of drug resistance
25 and, thus, new strategies to prevent and control resistant pathogens and tumor cells continue to be necessary.

Thus, a need exists for a novel approach to the development of anti-infective agents that overcome the drawbacks of current inhibitor-based therapeutic approaches. Various aspects of this invention satisfy this need by
30 providing methods and systems to identify target enzymes and methods to design and assay novel therapeutic prodrugs activated by these enzymes.

DISCLOSURE OF THE INVENTION

This invention provides a vertically integrated drug discovery program that Applicant has utilized to identify therapeutic enzyme targets and which
5 can be used to identify prodrugs which act by a unique mechanism of action (termed "Enzyme Catalyzed Therapeutic Activation" or "ECTA"TM). In one aspect, the invention provides systems and methods to identify enzyme targets *in silico*. In alternative aspect, the invention provides a method to design potential prodrugs activated by the enzyme targets. In a yet further
10 aspect of this invention, *in vitro* and *in vivo* assays are provided. The assays and prodrugs also are useful to test potential therapeutics. Further provided are methods to inhibit the growth of target organisms, cells, or host cells using the prodrugs of this invention. Methods to treat or alleviate the symptoms of selected diseases are further provided using the prodrugs of this
15 invention.

In one aspect, the *in silico* methods comprise selecting from a suitable database an enzyme or list of enzymes expressed by a target organism, by an infectious agent or in an infected host cell, or by or in a pathological cell. The results of this search are compared against a search of expressed
20 enzymes in or by a suitable control. The method selects for enzymes expressed in one cell type or organism but not in another. Various embodiments of this aspect are provided herein. For example, one embodiment identifies enzymes expressed by a pathogen or on in a pathogen-infected cell but not expressed in the host or uninfected host cell.

25 These methods identified and will identify enzymes that are targets ("target enzymes") for a novel ECTA approach to treat a variety of diseases including bacterial, fungal, parasitic and viral infections. In contrast, conventional therapies rely on the use of inhibitors of enzymes critical for target viability and/or proliferation. Consistent with Applicant's ECTA
30 approach, the prodrug compounds of this invention do not act as enzyme inhibitors but undergo enzyme catalyzed transformation by target enzymes

resulting in the generation of cytotoxic reaction product(s). The formation of cytotoxic species is achieved by engineering unique substrates (ECTA prodrugs or compounds) which are transformed into toxins by the target enzymes.

5 In one aspect, the target enzymes of this invention are pathogen-specific enzymes that are only expressed by pathogens, e.g., bacterial and fungal pathogens or in virally infected cells. In cases of intracellular parasites or viruses, host cell enzymes induced by the pathogen or infectious agent, or enzymes specifically encoded by the pathogen or infectious agent,
10 were targeted and can be targeted in further embodiments of this invention.

 The pharmaceutical and agricultural industries have focused on development of inhibitors of selected target enzymes for the development of anti-infectives, insecticides and herbicides (Shaner and Singh (1997) and Papamichael (1999)). This approach has suffered from several issues: (1) the
15 presence of salvage pathways which allow specific enzyme inhibition to be circumvented; (2) mutation of the enzyme so that it no longer binds inhibitor, but can still metabolize substrate; and (3) inhibitor-associated enzyme overexpression leading to resistance.

 The use of enzyme inhibitors for treatment can often result in harmful
20 and uncomfortable side effects. For example, protease inhibitors used in HIV treatment have been shown to affect glucose control, lipid metabolism, and body fat distribution (Mulligan (2000)).

 This invention defines a new ECTA approach that targets intrinsic enzymes ("iECTA" approach) which overcomes the limitations and problems
25 associated with prior art therapies. Applicant's approach is distinguished from prior approaches because iECTA enzymes are NOT endogenous enzymes for the host cell and are not necessarily related to drug resistance. In other words, only pathogens or pathogen-infected cells express the iECTA enzymes. The prodrug compounds which are designed to be selectively
30 activated by the iECTA enzymes also avoid side effects by achieving alternative, more selective therapies that preferentially affect diseased cells

with little or no effect on healthy tissue. To the best of Applicant's knowledge, this approach has not been described or utilized previously. Therapeutics designed and generated using iECTA technology supplement and complement present day enzyme inhibitor-based treatments.

- 5 The present method can be applied to identify target enzymes other than iECTA enzymes by searching a first suitable data structure (database) to obtain a first set of information relating to one or more enzymes associated with a target organism. In certain embodiments, the enzyme is overexpressed or selectively expressed as compared to a control counterpart.
- 10 A search also is conducted on one or more other suitable data structures (databases) to obtain one or more additional sets of information relating to one or more expressed enzymes associated with one or more additional class of organisms or by the same organism growing under in a different environment or in a different host. The first set of information is compared
- 15 to the one or more additional sets of information to identify enzymes in the first set of information that are not present in the one or more additional sets of information. These identified enzymes are targets for ECTA compounds.

- This invention further provides ECTA prodrugs. While each prodrug is selectively activated by a specific target enzyme counterpart, there are
- 20 some general features of ECTA prodrugs. Figures 2A and 2B describe general characteristics of ECTA prodrugs that distinguish them from conventional therapeutics. One feature of an ECTA enzyme/ECTA compound combination is the absence of irreversible inhibition or inactivation of the target enzyme by the ECTA compound, intermediates or
- 25 products of the reaction. In some embodiments, it is preferred but not necessary, that the ECTA target enzyme be critical for disease progression. This property means that resistance to iECTA compounds, which could result from disease/loss of target enzyme expression, may also result in decreased pathogenicity. To the best of Applicant's knowledge, this approach has not
- 30 been previously described or utilized.

Also provided is a method for the design of iECTA compounds or prodrugs which are selectively activated by yet to be identified iECTA enzymes using the methods of this invention. This invention further provides iECTA compounds or prodrugs activated by infectious agents or in host cells, e.g., the enzymes listed in Figure 7A and 7B and their biological equivalents. As used herein, and unless specifically excluded, Applicants intend for the biological equivalents of the iECTA compounds to be included in each embodiment of the invention. A "biological equivalent" is defined *infra*.

The iECTA compounds are provided alone or in combination with a liquid or solid carrier. Compositions comprising at least one iECTA compound or its biological equivalent in combination with an additional therapeutic is further provided by this invention.

Also provided is an assay for an iECTA compound that selectively inhibits the growth of an infectious agent in a target cell or an infected cell. The iECTA prodrug is contacted with its target enzyme in a cell-free system under suitable conditions. Activation by the target enzyme is monitored by methods well known in the art.

An *in vitro* screen is further provided by this invention. The iECTA enzyme is contacted with a pathogen or host cell containing or expressing the target enzyme. In one embodiment, the host cell and the prodrug are contacted under conditions that favor incorporation of the compound into the host cell. The pathogens or host cells are assayed for inhibition of growth or killing of the infectious agent or the host cell. Control systems and/or cells can be contacted with the prodrug and assayed.

This invention also provides a method for inhibiting the growth or proliferation of an infectious agent or a host cell by contacting the infectious agent or host cell with an effective amount of an ECTA prodrug, e.g., an iECTA prodrug.

A method for determining whether a subject will be suitably treated by an ECTA prodrug such as an iECTA prodrug is provided by this invention. As an example, an iECTA compound is delivered to an infected cell under

suitable conditions such that the growth of the infectious agent or infected cell is inhibited or the agent is killed.

Various modifications of the above methods are within the scope of this invention. For example, a different and/or additional enzyme target can be
5 assayed against the same iECTA prodrug or a different and/or additional prodrug can be assayed against the same target enzyme. Prior art therapeutics or therapeutic methods can be combined with the use of the iECTA prodrugs to enhance or modify the biological activity of the iECTA prodrug. These methods can also be modified by varying the amount of the iECTA prodrug
10 and/or additional therapeutic or alternatively or in combination, the order of the prodrugs and/or therapies can be modified, e.g., simultaneous or sequential. The sequential order can further be modified. These methods are further modified for prophylactic use.

A kit for determining whether a pathogen or pathogen-infected cell will
15 be suitably treated by an iECTA therapy is also provided by this invention. The kit comprises an effective amount of at least one compound of this invention and instructions for use.

As is apparent to those of skill in the art, the above iECTA methods can
20 be modified for application in other ECTA systems. These systems are described in more detail below.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows how ECTA technology preferentially targets selected cells.

25 Figures 2A and 2B are the process for successful identification of one embodiment of this invention, the identification of iECTA target enzymes and iECTA compounds.

Figure 2C is a flowchart for a process for identifying enzymes for
30 designing ECTA compounds in accordance with an embodiment of the present invention.

Figure 2D is a schematic diagram of an illustrative system capable of executing the process for identifying enzymes for designing ECTA compounds set forth in Figure 2C in accordance with an embodiment of the present invention.

5 Figure 3 shows the results of one embodiment of the method of this invention that utilizes tBLAST alignment for the identification of a "favorable reaction type" iECTA. Shown in the figure is a tBLAST alignment of *Pseudomonas aeruginosa* acetolactate synthase large subunit amino acid sequence with the human expressed sequence tag database
10 (translated in all six possible reading frames). The low "Expect" (E) values indicate that it is extremely unlikely that any of these alignments could occur by chance alone. Only the ten best E values and the best alignment are shown.

 Figure 4 shows the results of one embodiment of the method of this
15 invention that utilizes tBLAST alignment for the identification of a "favorable reaction type" iECTA. Shown in the figure is a tBLAST alignment of *Pseudomonas aeruginosa* acetolactate synthase small subunit amino acid sequence with the human expressed sequence tag database (translated in all six possible reading frames). E values = 6.5 indicating that
20 the alignment shown would be predicted to be found more than six times in the expressed tag database due to chance alone.

Figure 5 is a proposed mechanism of AcLS ECTA.

Figure 6 is a comparison of 2-oxobutyrate metabolism in humans and *E. coli*.

25 Figure 7A is a list of the Enzyme Commission Numbers representing intrinsic and unique enzymes for the following organisms:

1. "*Yersinia pseudotuberculosis*"
2. "*Yersinia pestis*"
- 30 3. "*Vibrio cholerae* El Tor N16961"
4. "*Ureaplasma urealyticum*"
5. "*Treponema pallidum*"
6. "*Streptomyces coelicolor*"

7. "Streptomyces coelicolor"
8. "Streptococcus pyogenes"
9. "Streptococcus pneumonia"
10. "Streptococcus mutans"
- 5 11. "Streptococcus equi"
12. "Staphylococcus aureus"
13. "Salmonella typhimurium"
14. "Salmonella typhi"
15. "Salmonella paratyphi"
- 10 16. "Salmonella enteritidis"
17. "Salmonella dublin"
18. "Saccharomyces cerevisia"
19. "Rickettsia prowazekii"
20. "Pseudomonas aeruginosa"
- 15 21. "Porphyromonas gingivalis"
22. "Pasteurella multocida"
23. "Neurospora crassa"
24. "Neisseria meningitidis ser. B "
25. "Neisseria meningitidis ser. A "
- 20 26. "Neisseria gonorrhoeae"
27. "Mycoplasma pneumoniae"
28. "Mycoplasma genitalium"
29. "Mycobacterium tuberculosis"
30. "Mycobacterium leprae"
- 25 31. "Mycobacterium bovis"
32. "Klebsiella pneumoniae"
33. "Helicobacter pylori"
34. "Helicobacter pylori J99"
35. "Haemophilus influenzae"
- 30 36. "Haemophilus ducreyi"
37. "Escherichia coli"
38. "Enterococcus faecium (DOE)"
39. "Enterococcus faecalis"
40. "Corynebacterium diphtheriae"
- 35 41. "Clostridium difficile"
42. "Clostridium acetobutylicum"
43. "Chlamydia trachomatis D"
44. "Chlamydia trachomatis M"
45. "Chlamydia pneumoniae AR39"
- 40 46. "Chlamydia pneumoniae CWL029"
47. "Campylobacter jejuni"
48. "Borrelia burgdorferi"
49. "Bordetella pertussis"
50. "Bordetella bronchiseptica"
- 45 51. "Bacillus subtilis"

Figure 7B is an abbreviated list consisting of all the EC number descriptions, but listing only one occurrence for each organism and consists of the 673 enzymes.

Figure 8 illustrates an illustrative system with a plurality of components in accordance with one embodiment of the present invention.

Figure 9 illustrates a representative hardware environment in accordance with one embodiment of the present invention.

Figure 10 shows chemical structures representative of different chemical classes of AcLS inhibitors currently used as herbicides.

Figure 11 shows the synthetic pathway for valine and leucine.

Figure 12 shows the synthetic pathway for isoleucine.

MODES FOR CARRYING OUT THE INVENTION

The practice of the present invention will employ, unless otherwise indicated, conventional techniques of modern biology and chemistry, including but not limited to molecular biology, biochemistry, microbiology, cell biology, enzymology, organic synthesis, medicinal chemistry, which are within the skill of the art. See, e.g., Sambrook, et al. Molecular Cloning: A Laboratory Manual, 2nd edition (1989); Current Protocols In Molecular Biology (F. M. Ausubel, et al. eds., (1987)); the series Methods In Enzymology (Academic Press, Inc.); PCR 2: A Practical Approach (M.J. MacPherson, B.D. Hames and G.R. Taylor eds. (1995)); Animal Cell Culture (R.I. Freshney, ed. (1987)); and J. March, Advanced Organic Chemistry: Reactions, Mechanisms And Structure, 4th edition (John Wiley & Sons, NY (1992)).

As used in the specification and claims, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a cell" includes a plurality of cells, including mixtures thereof.

The term "comprising" is intended to mean that the compositions and methods include the recited elements, but do not exclude others. "Consisting

essentially of' when used to define compositions and methods, shall mean excluding other elements of any essential significance to the combination. Thus, a composition consisting essentially of the elements as defined herein would not exclude trace contaminants from the isolation and purification method and pharmaceutically acceptable carriers, such as phosphate buffered saline, preservatives, and the like. "Consisting of" shall mean excluding more than trace elements of other ingredients and substantial method steps for administering the compositions of this invention. Embodiments defined by each of these transition terms are within the scope of this invention.

10 An "infectious agent" is intended to be synonymous with "pathogen" and includes, but is not limited to bacteria, parasites, rickettsia, virus, and fungus.

Any of the terms "toxin", "toxoid", "prototoxophore", "toxophore", "Tox", or "TOX" are synonymous and intend any molecule or functional group that is released or unmasked (revealed) upon the action of the enzyme resulting in toxicity to the pathogen, pathological cell or in an infected host cell. As apparent to those of skill in the art, the toxin or toxoid will vary with the target enzyme, the pathogen, the host cell and the subject being treated. Examples of toxins include, but are not limited to anthracyclins, vinca alkaloids, mitomycins, bleomycins, penicillins, cephalosporins, oxacillins, carbopenems, tetracyclins, chloramphenicols, macrolides, cycloserines, fluoroquinolones, glycopeptides, aminoglycosides, peptide antibiotics, oxazolidinones, quinolones, sulfonamides, cytotoxic nucleosides, pteridine family, nitrogen mustards, polyhalogenated biphenyls, diynes, podophillotoxins, taxoids, alkylating agents. Some of the useful representatives of these classes include doxorubicin, carminomycin, daunorubicin, aminopterin, methotrexate, methopterin, dichloromethotrexate, mitomycin C, porfiromycin, 5-fluorouracil, 6-mercaptopurine, cytosine arabinoside, podophillotoxin, etoposide, etoposide phosphate, melphalan, vindesine, vinblastine, vincristine, leurosidine, leurosine, bis-(2-chloroethyl)amine, trichlorcarban, trichlorocarbanilide,

15
20
25
30

tribromosalicylanilide, sulphamethoxazole, chloramphenicol, cycloserine, trimethoprim, chlorhexidine, hexachlorophene, fentichlor, 5-chloro-2-(2,4-dichlorophenoxy)phenol, 4-chloro-2-(2,4-dichlorophenoxy)phenol, 3-chloro-2-(2,4-dichlorophenoxy)phenol, 6-chloro-2-(2,4-dichlorophenoxy)phenol, 5-chloro-2-(3,4-dichlorophenoxy)phenol, 5-chloro-2-(2,5-dichlorophenoxy)phenol, 5-chloro-2-(3,5-dichlorophenoxy)phenol, 2,2'-dihydroxy biphenyl ether, halogenated 2-hydroxybenzophenones, 2-mercaptopyridine-N-oxide, combretastatin, camptothecin, apoptolidene, cisplatin, epothilone, halichondrin, hemiasterlin, methioprim, thapsigargin, chloroquine, 4-hydroxycyclophosphamide, etoposide, colchicine, melphalan, quercetin, genistein, erbstatin, N-(4-aminobutyl)-5-chloro-2-naphthalen-sulfonamide, pyridinyloxazol-2-one, isoquinolyloxazolone-2-one, verapamil, quinine, quinidine, chloroquine, 2-halo ketones, nitrosoureas and reactive byproducts, epoxides, bromonium ions, aziridinium ions. Functional groups that are unmasked or revealed include the conversion of vinyl halides to allyl halides as in NB1011 (discussed *infra*).

A "prodrug" is a precursor or derivative form of a pharmaceutically active agent or substance that is less cytotoxic to target or hyperproliferative cells as compared to the drug metabolite and is capable of being enzymatically activated or converted into the more active form (see Connors, T.A. (1986) and Connors, T.A. (1996)). The toxicity of the agent is directed to cells that are producing the converting enzyme in an amount effective to produce a therapeutic concentration of the cellular toxin in the diseased cell.

A "composition" is intended to mean a combination of active agent and another compound or composition, inert (for example, a detectable agent or label or a pharmaceutically acceptable carrier) or active, such as an adjuvant.

A "pharmaceutical composition" is intended to include the combination of an active agent with a carrier, inert or active, making the composition suitable for diagnostic or therapeutic use *in vitro*, *in vivo* or *ex vivo*.

As used herein, the term "pharmaceutically acceptable carrier" encompasses any of the standard pharmaceutical carriers, such as a phosphate buffered saline solution, water, and emulsions, such as an oil/water or water/oil emulsion, and various types of wetting agents. The compositions
5 also can include stabilizers and preservatives. For examples of carriers, stabilizers and adjuvants, see Martin, Remington's Pharm. Sci., 15th Ed. (Mack Publ. Co., Easton (1975)).

An "effective amount" is an amount sufficient to effect beneficial or desired results. An effective amount can be administered in one or more
10 administrations, applications or dosages. The term "effective amount" is to include therapeutically or prophylactically effective amounts. Thus, the term also refers to an amount effective in treating or preventing an infection in a patient or an infestation in a plant either as monotherapy or in combination with other agents.

15 The term "prophylactically effective amount" refers to an amount effective in preventing infection in a subject or plant infestation.

The term "linker" indicates a spacer or connector between two parts of a single molecule such that when a particular bond is severed between the two parts of the molecule separate.

20 "Inhibiting the growth" of a microorganism or infected cell means reducing by contact with an agent, the rate of proliferation of such a microorganism or infected cell, in comparison with a control microorganism of the same species not contacted with this agent or as compared to an uninfected cell.

25 The term "treating" refers to any of the following: the alleviation of symptoms of a particular disorder in a patient; the improvement of an ascertainable measurement associated with a particular disorder; or a reduction in microbial number. One of skill in the art can determine when a host has been "treated" by noting a reduction in microbial load or an
30 alleviation in symptoms associated with infection.

A "subject," "individual" or "patient" or "host" is used interchangeably herein and refers to plants, avians, fish and animals, e.g., a vertebrate, preferably a mammal, more preferably a human. Mammals include, but are not limited to, murines, simians, humans, farm animals, sport
5 animals, and pets.

A "control" is an alternative subject or sample used in an experiment for comparison purpose. A control can be "positive" or "negative". As known to those of skill in the art, a "suitable control" is variable and depends in part on one or more of the following criteria: the target pathogen, the
10 target enzyme, expression level of the target enzyme, the host cell, the subject or host as well as the specific genotype or phenotype of each. For example, when the object of the method is to identify target enzymes in pathological cells such as cancer, a suitable control can be one or more of a normal counterpart cell, a counterpart cancer cell that has not undergone any
15 therapy or been exposed to an inducing agent or a different therapy or a cell that has been treated in a different environment or microenvironment, e.g., *in vitro* versus *in vivo*. Alternatively, the control cell can be one that been or will be treated with a known therapeutic or therapeutic method. When the object of the invention is to identify intrinsic ECTA target enzymes
20 expressed by pathogens or in pathogen-infected cells, the control counterpart can be one or more of a pathogen that has not been exposed to an inducing agent or one that is not infected with the pathogen.

An "inducing agent" includes any agent (chemical, physical or mechanical) which alters the genotype or phenotype of a pathological cell or
25 infectious agent or infected cell. Examples include prior chemotherapy (in the case of cancer), prior treatment with one or more antibiotics (in the case of pathogens and pathogen-infected cells) or prior exposure to another organism resulting in the exchange of genetic material, e.g. plasmids that confer antibiotic resistance to a host cell. Additional examples include, but
30 are not limited to exposure to radiation, chemicals, ultra-violet light, metals or genetic manipulation.

As used herein, "expressed at elevated levels" in the context of infectious disease, is intended to include any amount over the base line or control as compared with host cells (e.g., an uninfected or normal cell) taking into consideration the sensitivity of the detection system and statistical variation in the computation methods. In the context of cancer, "expressed at elevated levels" is intended to include any amount that is more than an amount over the base line or control (e.g., a normal counterpart cell) taking into consideration the sensitivity of the detection system and statistical variation in the computation methods. In some aspect, it is at least 2X, or more than 3X or preferably more than 4X than that expressed in a normal cell.

A "favorable reaction type" as used herein, refers to a chemical reaction catalyzed by an enzyme wherein an enzyme that catalyzes such a reaction has been shown to be effective at metabolizing ECTA substrates.

As used herein, the terms "pathological cells", "target cells", "host cells" and "hyperproliferative cells" in the context of cancer, encompass cells characterized by the activation by genetic mutation or the endogenous overexpression of an intracellular enzyme which may confer resistance to the inhibitory or cytotoxic effects of chemotherapy. Overexpression of the enzyme can be related to loss of tumor suppressor gene product function drug resistance or the genetic instability associated with a pathological phenotype. In the context of infectious agents, the terms encompass cells infected with or containing an infectious agent as defined herein. In the context of cells and infectious agents showing resistance to antibiotics, the terms encompass cells overexpressing an enzyme which confers resistance to the cytotoxic effects of the antibiotic.

"Sequence comparison" is used to compare character strings representing proteins or fragments of DNA to gather evidence for common function or biological origin. Proteins which are thought to have a common ancestor are called homologous. The process of evolution introduces mutations in DNA which may take the form of: the substitution of one or

more nucleic acids for another; the deletion of one or more nucleic acids; or the insertion of one or more nucleic acids.

These changes in the genetic material of organisms can lead to corresponding changes in the amino acid sequences for the corresponding
 5 proteins. Close “homologs” tend to share substantial portions of their amino acid sequences, and so sequence comparison algorithms are used as a tool to detect homologies. It is, however, by no means a foolproof tool: there are examples of proteins that have substantial sequence similarity but serve very different functions and exhibit different three-dimensional structures, and so
 10 are probably not homologs. On the other hand, there are proteins with very little sequence similarity but which nonetheless have similar functions and three-dimensional structures, and are considered homologs.

A biological sequence is a finite string of characters drawn from some alphabet. Typically these strings will represent amino acid sequences
 15 (proteins; alphabet size = 20) or nucleic acid sequences (DNA; alphabet size = 4). We write $s[i]$ for the i th character of s , where i is between 1 and $|s|$, the length of s .

An “alignment” of two strings s and t on the same alphabet A is a pair of strings s' and t' on the alphabet $A + \{'-\}' =: A'$, where $'-'$ is a special
 20 character not in A that represents a “gap” or “space”, such that

- $|s'| = |t'|$;
- removing all the $'-'$ characters from s' leaves s , and similarly for t' and t ; and
- gaps are never paired with gaps; that is, if $s'[i] = '-'$ then we do
 25 *not* have $t'[i] = '-'$, and *vice-versa*.
- The goal of pairwise sequence alignment algorithms is to find a high-scoring alignment of a given pair of sequences (or subsequences of those sequences), according to some prescribed alignment scoring method.

30 “Classic dynamic programming algorithms” are thought of as *exact*, in the sense that they are guaranteed to compute the best possible alignment of

the two strings under the supported alignment scoring system. The scoring systems usually prescribes a method of scoring character pairings, and the total score for a particular alignment is the sum of the character pair scores. A scoring function $S: A' \times A' \rightarrow R$ is symmetric in its two arguments.

- 5 Typically, character matches are awarded positive scores, and mismatches may be assigned different scores depending on the severity of the mismatch (for example, two amino acids that have similar chemical properties may be substituted for one another without greatly affecting the function of the resulting protein, and matching one with the other may be almost as good as
- 10 a perfect match and be awarded a positive score. On the other hand, two amino acids may have very different chemical properties and their mismatch may be awarded a negative score). Gaps are usually awarded negative scores. In the simplest case, the penalty for a gap in the completed alignment is proportional to its length, and the scoring function may be represented as a
- 15 symmetric matrix. However, there are biological reasons for penalizing small gaps more heavily than larger ones, and popular implementations usually use *affine* gap penalties of the form $I + R \cdot (k-1)$ for a gap of length k ; this requires a minor change in representation for the scoring function.

- These algorithms proceed by constructing a $(|t|+1) \times (|s|+1)$ matrix M
- 20 of partial alignment scores, frequently called the "dynamic programming matrix". $M[i,j]$ is interpreted as the score of the best alignment of the subsequences $t[1..i]$ and $s[1..j]$ that ends by pairing $t[i]$ with $s[j]$. The zeroth column and row represent leading gaps, and are assigned negative scores according to the gap scoring regimen. The fundamental notion in all these
- 25 algorithms is that the value of $M[i,j]$ must be the best (maximum) of

$$\begin{aligned} M[i,j-1] + S['-',j] & \text{ pair a gap in } t' \text{ with } s[j] \\ M[i-1,j-1] + S[i,j] & \text{ pair } t[i] \text{ with } s[j] \\ M[i-1,j] + S[i,'-'] & \text{ pair } t[i] \text{ with a gap in } s' \end{aligned}$$

assuming that $M[i-1,j]$, $M[i-1,j-1]$ and $M[i,j-1]$ are all previously computed.

A highest-scoring alignment can then be recovered from the matrix M by using a "traceback procedure". Tracing back from element $M[i,j]$

involves recomputing the scores for the extensions of prefix alignments as above, then selecting one that equals $M[i,j]$, and then tracing back from the corresponding element $M[i-1,j]$, $M[i-1,j-1]$, or $M[i,j-1]$ (Of course, it could be that two or all three of the prefix alignments lead to the same score; in this case, there is usually some policy on selecting one type of alignment over another. It is also possible to maintain a list of equivalent alignments and report all of the best-scoring alignments). The traceback starts at the maximum element in the last row together with the last column of M , and ends when the zeroth row or column is reached.

- 10 The algorithm described above is similar to the Needleman-Wunsch global alignment algorithm. The algorithm is called a "global" alignment algorithm because it tries to find the best alignment over the whole strings s and t . With a slight change, the same technique can be used to find the best *local* alignment between s and t , that is, the highest-scoring (global)
- 15 alignment of substrings $s[i_1..i_2]$ and $t[j_1..j_2]$. The changes required are:
- the zeroth row and column are initialized with zeros;
 - in the dynamic programming computation, let $M[i,j]$ be the maximum of the given quantities above together with zero.
 - in the traceback procedure, start at the maximum element for
- 20 the entire dynamic programming matrix, and stop as soon as an $M[i,j] = 0$ is encountered.

This is

the Smith-Waterman local alignment algorithm. Of the classic dynamic programming methods, it is the most commonly used.

- 25 For biological reasons one may wish to not penalize gaps that occur at the beginning or end of an alignment. These variations are easily accommodated by changing the initialization of the zeroth row and column of M .

- 30 The classic algorithm as presented requires $O(|s| * |t|)$ (quadratic) time and space. The matrix M is normally filled in row-by-row or column-by-column, and it is never necessary to have more than two rows or columns of

the matrix in memory at once. In many applications, the actual alignment may not be necessary, and only the maximum score over all possible alignments may be required. In this case, we need not store M but instead store only those rows (columns) necessary for the computation and the
5 maximum value. In this case the algorithm uses only linear ($O(\min(|s|, |t|))$) space.

It is however possible to recover the optimal alignment using only linear space, at the expense of doubling the computation time. The fundamental idea is to use a divide-and-conquer approach and recompute
10 parts of the dynamic programming matrix (actually, maximum values over rectangular subregions of it) as required.

The "FAST" algorithm is a heuristic approach that tries to approximate the best (local) alignment and score while reducing the computational expense of the Smith-Waterman algorithm. Strictly speaking,
15 it is a database search algorithm: we have a *query string* q , and wish to compare it against every string in a database of strings. Typically, it is best to report the best n scores and corresponding alignments, where n is much smaller than the database size. The computation for each database string s is a local alignment with q , and proceeds in four stages:

- 20 1) the strings are rapidly scanned for exact substring matches of length $ktup$. $ktup$ is usually quite small, only 1 or 2. A table of $|q| + |s| - 1$ counters is maintained, one for each diagonal in a table, similar to the dynamic programming matrix M ; for a match of a k -tuple with starting points $q[i]$ and $s[j]$, the i - j th counter is
25 incremented. At the end of this stage, the table of counters gives the number of *hits* for each diagonal.
- 2) for each diagonal with more than one hit, hits are merged into *regions*. These regions may contain mismatches, but since everything is in the same diagonal, there are no gaps.
- 30 3) the five best regions are rescored using a protein substitution matrix (for example, PAM120, PAM250, or, more recently, a

BLOSUM matrix). The best of these scores is reported for the sequence pair, and is called the *initial score*. The matches in the database are ranked according to their initial scores.

- 5 4) the pairs with the n best initial scores are then re-examined using a modified Smith-Waterman alignment algorithm that is restricted to a band 64 diagonals wide centered around the best diagonal. This new score is called the *optimized score*. In reporting the final results, both initial and optimized scores are listed; often very good matches have a dramatically better
10 optimized score than the initial score.

The FAST package includes a program for testing the statistical significance of high-scoring matches. It works by scrambling one of the strings and running the Smith-Waterman algorithm on the new pair; this is repeated many times. If the score reported for the original pair is sufficiently
15 far from the mean score for the alignments on the scrambled strings, the match is considered significant (unlikely to be due to chance). Recent versions of FASTA evaluate the statistical significance of scores using a theory based on extreme value distributions.

Like FAST, BLAST (*Basic Local Alignment Search Tool*) is another
20 heuristic database search algorithm that tries to reduce the time required to find good pairwise alignments. Like FAST, BLAST attempts to find high-scoring subsequences with no gaps, but its approach is a little different. Given a query protein sequence q and a database sequence s , BLAST:

- 25 1. examines the query sequence to find high-scoring substrings or *words* for matches. There are two parameters that affect the search for these words: a word length w and a threshold score T . The algorithm constructs the set of all w -length contiguous subsequences (w -mers) of the query q , and then for each w -mer d finds all possible w -mers that score at least T when compared
30 with d using a protein substitution matrix (usually PAM, or, more recently, BLOSUM). Not all w -mers from q need

- contribute to the word list: if a word d scores less than T when compared with itself, it will not contribute at all;
2. scans the database using a hashtable or specially-constructed DFA for exact matches to entries in the word list (*hits*); and
 - 5 3. extends hits. A hit is extended by adding characters to the front and back of each of the two substrings until a maximal score (under the same substitution matrix as above) is reached: dropping or adding a pair of characters at either end lessens the score. In practice, the pair is discarded if the score falls a
10 prescribed distance below the best score reported for the same-length extension so far.

The best extension scores (or *maximal segment pair (MSP)* scores) are used to rank the database strings. The process for DNA is similar, except that the scoring is simpler (there are no substitution matrices), and the values
15 of the parameters are different.

BLAST attempts to estimate the statistical significance of the MSP scores based on a statistical theory of how MSP scores should be distributed for random strings.

20 Identification of ECTA Target Enzymes -Methods and Systems

A method is provided that identifies ECTA enzymes. A first suitable data structure is searched to obtain a first set of information relating to one or more enzymes associated with a target organism. The enzyme can be one that is expressed, overexpressed or selectively expressed. This search
25 provides a first enzyme list. A search also is conducted on one or more other suitable data structures to obtain one or more additional sets of information relating to one or more expressed enzymes associated with one or more controls. The first set of information is compared to the one or more additional sets of information to identify enzymes in the first set of
30 information that are not present (or absent) in the first search, but not the second. These identified enzymes are targets for ECTA compounds.

Examples of data structures include, but are not limited to databases of genetic or expressed genetic information relating to enzymes. The information may be in the form of DNA, RNA or protein and may include, where appropriate information relating to quantitative expression of the enzyme. The information may be organized in any manner. In one aspect, the information is restricted to the pathogen or host cell expressing it. In another aspect, the information is organized by tissue distribution, e.g., enzymes expressed in cancer cells, enzymes expressed in normal, non-cancerous cells, enzymes overexpressed as a result of prior therapy (e.g., antibiotic or chemotherapy), or enzymes expressed in a specified tissue type (e.g., breast versus liver). The organism is selected from the group consisting of an animal, a vertebrate, an avian, a mammal, a human patient, a pet, a farm animal, a plant, and a plant root. In a further aspect, the target enzyme is present in the pathogen or in the infected cell but normally absent in the host or in uninfected host cells.

Although the method can utilize privately generated databases, it also can be practiced using publicly available databases, as exemplified below. Examples of databases include, but are not limited to commercially available genomic and protein databases (e.g., LifeSeq® available from Incyte Genomics, Inc.). Examples of public domain databases containing information that can be processed according to the invention can be accessed at a number of internet locations or Web sites. One such database is located at a Web site called WIT (a world wide web based system to support the curation of functional assignments made to genes, now "ERGO") maintained by the Argonne National Laboratory of the University of Chicago. Another such database is located at a web site called KEGG (Kyoto Encyclopedia of Genes and Genomes) currently maintained by the Institute for Chemical Research at Kyoto University, Japan. The actual URL (universal resource locator) used to access WIT can change, but has recently been used as <http://wit.mcs.anl.gov/WIT2>. Similarly, the KEGG site <http://www.blast.genome.ad.jp/kegg/kegg2.html> can be used.

In one embodiment, the databases are searched for enzymes using their respective Enzyme Commission Numbers ("EC"). ECs uniquely identify individual enzymes and are interpretable in terms of the reaction mechanism of each enzyme so named. Thus, these numbers can be useful for
5 sorting through large numbers of candidate enzyme entries in a variety of databases.

In another embodiment of the invention, the method requires selecting from a database an enzyme that is expressed by an infectious agent or in an infected cell and comparing these results with a database of expressed
10 enzymes in at least one different class of organisms. In one aspect, these results are further compared to a database comprising enzymes expressed by yet a different class of organisms to identify an enzyme that is expressed in at least one class of organisms but not expressed in another class of organisms. For example, the method is useful to identify target enzymes present in a
15 pathological organism but absent in an uninfected subject host such as enzymes present in pathogenic bacteria but not in human cells.

In a further embodiment of the present invention, a list of the identified enzymes may also be outputted. In another embodiment of the present invention, the identified enzymes may further be organized into a
20 first set of enzymes capable of being placed into metabolic pathways and a second set of enzymes not capable of being placed into metabolic pathways. The first and second sets of enzymes may then be displayed such that the first set of enzymes is distinguishable from the second set of enzymes. In such an embodiment, a third data structure may be queried to organize the identified
25 enzymes.

The methods described herein selected for iECTA targets shown in Figures 7A and 7B. However, new entries are added everyday to the databases. Accordingly, the practice of this invention subsequent to the filing of the present application will identify iECTA enzymes not listed in
30 Figure 7A and 7B. In some embodiments, the newly identified enzymes are presently identified by percentage homology to an enzyme shown in Figures

7A and B. Also termed “biologically equivalent iECTA enzymes” are characterized by possessing at least 75%, or at least 80%, or at least 90% or at least 95% amino acid sequence homology as determined using a sequence alignment program under default parameters correcting for ambiguities in the sequence data, changes in nucleotide sequence that do not alter the amino acid sequence because of degeneracy of the genetic code, conservative amino acid substitutions and corresponding changes in nucleotide sequence, and variations in the lengths of the aligned sequences due to splicing variants or small deletions or insertions between sequences that do not affect function.

10 In a separate embodiment, a “biological equivalent” intends a protein sequence identified by BLAST search using our the iECTA sequence as input and that results in “hits” having E values indicating that the probability that the “hit” is due to chances is less than 1 in 1000, or 1 in 100, or 1 in 10. This identifies any protein that is related at all, even if the sequence similarity by alignment is less than 10%. Catalytically equivalent enzymes have been identified by BLAST search in this way, even when the % similarity is on the order of a few percent. Human telomerase is a good example of this, because it was identified by BLAST search using a protein sequence obtained from the corresponding enzyme of the ciliate *Euplotes*.

20 In general, iECTA enzymes having one or more of the following characteristics: 1) enzyme is expressed only by the pathogen of interest or in the cell infected with the pathogen; 2) enzyme is expressed by the pathogen of interest but not by the host organism; 3) enzyme is part of a critical biochemical pathway for the pathogen or cell infected by the pathogen; or 4) enzyme is or is analogous to an enzyme present in a “favorable reaction type” in the pathogen or in a cell infected by the pathogen.

25 Other examples of pathogen-specific enzymes include drug resistance enzymes expressed by those organisms. Examples include resistance plasmid-encoded drug-modifying enzymes (e.g., chloramphenicol acetyl transferase and other plasmid- or chromosomally-encoded enzymes like beta-lactamases, Table 1, Part C). Intrinsic ECTA targets differ from resistance

ECTA targets only in that the intrinsic enzymes (e.g., viral encoded protease) are present or expressed in naïve or untreated pathogens. Resistance enzymes are typically only expressed or expressed at elevated levels as a result of challenge by therapeutic agents such as enzyme inhibitors.

- 5 As noted above, the method of this invention, identifies enzymes that occur in one class of organisms, but NOT in another class. The "class" can be defined by the user. It is likely that, contained in the output list of enzymes, some enzymes will be more amenable than others to development for iECTA. The described technique allows for an examination of the
- 10 original output list for enzymes with unique mechanisms of action (analogous to the enzymes described in Table 1, below).

Table 1. Examples of Enzyme Targets for ECTA Technology

Enzyme	Example Disease/Pathogen	Example Inhibitors	Mechanisms of Resistance	Referenced (Examples)
Part A. Examples of Endogenous Overexpressed Enzymes in Cancer				
Thymidylate synthase (TS)	Cancer	Fluoropyrimidines, Tomudex, Multitargeted Antifolates (MTA)	Overexpression Mutations Salvage Pathways	Lonn et al. (1996) Kobayashi et al. (1995) Jackman et al. (1995)
Dihydrofolate reductase (DHFR)	Cancer	Methotrexate	Overexpression	Banerjee et al. (1995) Bertino et al. (1996)
Ornithine decarboxylase (ODC)	Cancer	α -Difluoromethylornithine (DFMO)	Overexpression	Das et al. (2000)
Cyclin-dependent Kinases 4 and 6 (cdk 4,6)	Cancer	Flavopiridol	Unknown	Ruas and Peters (1998) Sausville et al. (1999)

Enzyme	Example Disease/ Pathogen	Example Inhibitors	Mechanisms of Resistance	Referenced (Examples)
Table 1. Part B. Virally Encoded Enzymes				
Viral Protease	HIV, HCV	Indinavir, ritonavir	Mutations	Venturi et al. (2000) Blight et al. (1998)
Reverse Transcriptase	HIV, other retrovirus	AZT, other nucleoside or Nonnucleoside analogs	Mutations	Shirasaka et al. (1995) Venturi et al (2000) Casado et al. (2000)
RNA-dependent RNA-polymerase	HCV and other Flaviviruses	Peptide-based Alpha-diketones	Unknown	Blight et al. (1998) Han et al. (2000)
Neuraminidase (NA)	Influenza	Derivatives of 2-deoxy-2,3-dehydro-N-acetylneuraminic acid (Neu5Ac2en)	Mutations	Staschke et al. (1995) Varghese et al. (1998)
DNA polymerase (DNase)	Hepatitis B	Lamivudine	Mutations	Malik et al. (2000)

Table 1. Part C. Pathogen-Specific Enzyme				
Acetolactate Synthase (AcLS)	Bacterial and Fungal Infections	Herbicides e.g., sulfonyleurea	Overexpression Mutations	Whitcomb. (1999) Harms et al. (1992)
Ketol-Acid Reductoisomerase (KARI)	Bacterial and Fungal Infections	N-Hydroxy-N-isopropyl-oxamate	Not described	Aulabaugh and Schloss (1990)
Beta-lactamase (BL)	Drug-Resistant Bacterial Infections	Clavulanic acid Sulbactam	Overexpression Mutations	Bonomo et al (1999)
Dihydrofolate reductase (DHFR)	Drug-Resistant Bacterial Infections	Trimethoprim	Mutations	Amyes et al, (1992)
Chloramphenicol Acetyl Transferase (CAT)	Drug-Resistant Bacterial Infections	N/A	Overexpression	Kleanthous et al (1985) Shaw et al (1988) Shaw et al (1991)
Peptidoglycan Glycosyltransferase (aka Penicillin Binding Protein (PBP))	Drug-Resistant Bacterial Infections	Methicillin Vancomycin	Mutations	Berger-Bachi et al (1989) Hanaki et al, (1998)
Van A Peptide Ligase	Drug Resistant Bacterial Infections	Vancomycin LY333328	Mutations	Armstrong and Cohen (1999)
Van H Pyruvate D-Lactic Acid Convertase				Lessard et al, (1999)
Van HD dehydrogenase				Arthur et al. (1999)
Van YD DD-carboxypeptidase				Casadewall et al. (1999)

Table 1. Part C. (continued)				
D-alanine racemase	Mycobacteria	D-cycloserine	Overexpression	Caceres et al. (1997)
Mycolate maturation enzymes	Tuberculosis Mycobacteria	Thiolactomycin	Not Known	Yuan et al (1998)
Catalase Peroxide	Tuberculosis Mycobacteria	Isoniazid	Mutation	Meisel et al (1998)
Kat G-encoded catalase	Mycobacteria	Isoniazid	Overexpression and mutation	Mdluli et al. (1998)
InhA, NADH-dependent enoyl acyl carrier protein reductase	Mycobacteria	Isoniazid	Overexpression and mutation	Miesel et al. (1998)
Pyrazine amidase	Mycobacteria	Pyrazinamide	Mutation	Raynaud et al. (1999)
CMA-1, related to <i>E. coli</i> cyclopropane fatty acid synthase	Mycobacteria	Unknown	Unknown	Yuan et al. (1995)

The methods can be practiced using local alignment search algorithms (i.e., BLAST, FASTA) or by directly searching various genome sequence databases, see for example, Figures 3 and 4. This method can be applied to any target organism for which DNA sequence information is available. These databases include microbial genome databases, human genome databases, and expressed sequence tag databases. This invention provides a way of querying databases using genome sequence information to identify potential iECTA enzymes. For example, an open reading frame (ORF) amino acid sequence is obtained for each target using a search program to determine which of these represents an enzyme (EC number) according to current annotation. Using a local alignment algorithm such as BLAST, the amino acid sequence of the candidate enzyme is compared with each sequence of a database consisting of human expressed sequence tags. The result obtained by these comparisons can be interpreted as a probability that

an enzyme represented by sequence data is expressed in human cells. This would indicate that the target organism shared a common ancestor with humans and that the enzyme from humans and the target organism are related. If the enzymes are so related, they may share traits such as similar
 5 mechanism of action and similar substrate specificity and this might counter indicate the usefulness of related enzymes as iECTA targets.

As noted above, the methods of this invention identify enzymes and metabolic pathways present in the pathogenic organisms, but absent in the host, and as such, are a source of selectivity. For example, some pathways,
 10 as well as the enzymes involved, have only been found in bacteria, fungi and plants and not in mammalian cells. One example is the synthesis of "essential" amino acids - amino acids that animals cannot synthesize and must ingest with food (see Table 2 and Nelson and Cox (1972)).

15 **Table 2. Amino Acid Biosynthetic Pathways Not Present in Humans**

Threonine	Leucine
Methionine	Histidine
Valine	Phenylalanine
Isoleucine	Tryptophan
Lysine	

This invention also provides a means of uncovering potential enzyme targets in pathways that are common only in biochemical outcome but differ
 20 in route taken. For example, cysteine is not an essential amino acid, but many pathogenic microbes synthesize cysteine in a fashion different from humans and other higher organisms. The enzyme cysteine synthase (EC 4.2.99.8) is not found in humans, drosophila, or mus musculus according to our search algorithm and is therefore a potential ECTA target.

25 These promising results suggest the utility of the iECTA approach in treating other diseases characterized by expression of pathogen specific enzymes (Table 1; Parts B and C). For example, HIV-1 protease (Table 1; Part B) is required for specific cleavage of virus-encoded gp160 to yield

gp120, which is necessary for virus maturation (Markowitz and Ho (1996)). Protease inhibitors have been used for patient treatment, and inhibitor-resistant mutants of the enzyme have been described (Shirasaka, et al. (1995) and Venturi, et al. (2000)). A possible iECTA compound is based on the
5 structure of a pharmacophore derived from the natural gp160 cleavage site (Kirkpatrick, et al. (1999); Bohoczek and Martin (1997); and Ekins, et al. (1999)), such that reaction with protease leads to the formation of a toxin in virus infected cells. Because HIV protease is present only in virus-infected cells, only those cells will be affected following exposure to an HIV protease
10 iECTA compound. Other examples of possible virally encoded iECTA targets include essential viral-specific replication enzymes like reverse transcriptase encoded by retroviruses (e.g., HIV), and RNA-dependent RNA polymerase encoded by flaviviruses (e.g., HCV). For iECTA applications it is critical that the target enzyme is required for viability or pathogenesis of the
15 infectious agent. For this reason, dispensable viral enzymes are not preferred targets. An important example of a dispensable viral enzyme is the herpes virus-encoded thymidine kinase (Coen (1996) and Oram, et al. (2000)). For this reason, the herpes virus-encoded thymidine kinase is not included as a preferred target in Table 2, while essential enzymes like reverse transcriptase,
20 RNA-dependent RNA polymerase and virally-encoded proteases are included. Pathogen specific enzymes are listed in Table 1 (Part C).

Hardware Implementation of the Methods and Systems

The methods of this invention operate on a typical computer system.
25 The computer system can include various input devices such as a keyboard. The computer system also includes a processor such as CPU and internal memory. The processor may be a special purpose processor with database processing capabilities or it may be a general-purpose processor. The memory may comprise various types of memory, including RAM, ROM, and
30 the like. The computer system also includes external storage that includes

devices such as disks, CD ROMs, ASICs, external RAM, external ROM and the like.

The present invention can be implemented as part of the processor or as a program residing in memory and external storage and running on processor or as a combination of program and specialized hardware. When
5 in memory and/or external storage the program can be in a RAM, a ROM, an internal or external disk, a CD ROM, an ASIC or the like. In general, when implemented as a program or in part as a program, the program can be encoded on any computer-readable medium or combination of computer-
10 readable media, including but not limited to a RAM, a ROM, a disk, an ASIC, a PROM and the like. The computer system also includes a display and, optionally, an output device such as a printer.

The computer system can run any operating system and can be implemented in any computer programming language or combination of
15 computer programming languages, although preferably it is implemented, at least in part, in a language which is suitable for database access and manipulation.

Thus, in another aspect, this invention provides a system for identifying enzymes for designing Enzyme Catalyzed Therapeutic Activation
20 (ECTA) compounds, comprising logic for searching a first data structure to obtain a first set of information relating to one or more enzymes associated with a target organism that are expressed in a pathological cell or by a infectious agent or in an infected cell as compared to a suitable control and logic for searching one or more other data structures to obtain one or more
25 additional sets of information relating to one or more expressed enzymes associated with one or more additional classes of organisms that are expressed respective class. The system also comprises logic for comparing the first set of information to the one or more additional sets of information to identify enzymes in the first set of information that are not present in the
30 one or more additional sets of information, wherein the identified enzymes are capable of being used to design ECTA compounds. In one embodiment,

the enzymes are overexpressed as compared to a suitable control. In yet a further aspect, the overexpressed enzyme is the result of prior treatment, e.g., antibiotic or chemotherapy. In another aspect, the system further comprises logic for outputting a list of the identified enzymes. In yet a further aspect, 5 the system comprises logic for organizing the identified enzymes into a first set of enzymes capable of being placed into metabolic pathways and a second set of enzymes not capable of being placed into metabolic pathways; and logic for displaying the first and second sets of enzymes such that the first set of enzymes are distinguishable from the second set of enzymes. In a further 10 embodiment, a third data structure is queried to organize the identified enzymes.

The system can be part of a network that is utilized to search at least one of the first data structure and the second data structure. Examples of suitable networks include, but are not limited to, a network capable of 15 communicating utilizing TCP/IP or IPX protocols.

In a further aspect, the information relating to the one or more enzymes of the organism includes information about Enzyme Commission (EC) numbers of the one or more enzymes. In yet a further aspect, the one or more additional sets of information relating to the one or more expressed 20 enzymes associated with one or more classes of organisms includes information about Enzyme Commission (EC) numbers of the one or more expressed enzymes.

This invention further provides a computer program product for identifying enzymes for designing Enzyme Catalyzed Therapeutic Activation 25 (ECTA) compounds, comprising computer code for searching a first data structure to obtain a first set of information relating to one or more enzymes associated with a pathological cell, by an infectious agent or in an infected cell and computer code for searching one or more other data structures to obtain one or more additional sets of information relating to one or more 30 expressed enzymes associated with one or more additional classes of organisms that are express. The program product also contains computer

code for comparing the first set of information to the one or more additional sets of information to identify enzymes in the first set of information that are not present in the one or more additional sets of information, wherein the identified enzymes are capable of being used to design ECTA compounds.

5 Further additions include, but are not limited to computer code for outputting a list of the identified enzymes, computer code for organizing the identified enzymes into a first set of enzymes capable of being placed into metabolic pathways and a second set of enzymes not capable of being placed into metabolic pathways; and computer code for displaying the first and second

10 sets of enzymes such that the first set of enzymes are distinguishable from the second set of enzymes. When a third data structure is queried or searched, a third code is supplied to query and optionally organize the information. Optionally, the information regarding enzyme expression can be organized according to ECC number. The system can work on a stand

15 alone computer system or be a component of a network. In one aspect, the network is capable of communicating utilizing TCP/IP or IPX protocols.

Figure 2C is a flowchart for process 240 for identifying iECTA enzymes for designing iECTA compounds in accordance with an embodiment of the present invention. In operation 242, a first data structure

20 is searched to obtain a first set of information relating to one or more enzymes associated with a target organism that are expressed at an elevated level in a pathological cell as compared to a normal counterpart cell or host cell. In operation 244, one or more other data structures are searched to obtain one or more additional sets of information relating to one or more

25 expressed enzymes associated with one or more additional classes of organisms that are expressed at elevated levels in the respective class. The first set of information is compared to the one or more additional sets of information in operation 246 to identify enzymes in the first set of information that are not present in the one or more additional sets of

30 information.

In one aspect of the present invention, a network may be utilized to search the first data structure and/or the second data structure. In such an aspect, the network may be capable of communicating utilizing TCP/IP and/or IPX protocols. In another aspect, the information relating to the one or more enzymes of the target organism may include information about Enzyme Commission (EC) numbers of the one or more enzymes. Similarly, the one or more additional sets of information relating to the one or more expressed enzymes associated with one or more classes of organisms may also include information about Enzyme Commission (EC) numbers of the one or more expressed enzymes. In a further aspect, the identified enzymes may be capable of being used to design iECTA compounds.

As an option, operations 244 and 246 may be executed sequentially for each additional database. In other words, operations 244 and 246 may be repeated for each additional database searched. For example, operations 244 and 246 may be executed for a first additional database (i.e., a second database) to obtain a first output which identifies enzymes in the first set of information that are not present in the information obtained from the first additional database. Operations 244 and 246 may then be executed utilizing the first output and a second additional database (i.e., a third database) to obtain a second output which identifies enzymes in the first set of information that are not present in the information obtained from the second additional database, and so on.

Figure 2D is a schematic diagram of an illustrative system 250 capable of executing the process 240 for identifying enzymes for designing ECTA compounds set forth in Figure 2C in accordance with an embodiment of the present invention. In particular, a user's computer 252 is connected via a network 254 (e.g., a LAN or a WAN such as the Internet) to a plurality of databases 256, 258, 260 (i.e., data structures). As illustrated in Figure 2D, each database 256, 258, 260 may be hosted by a separate server 262, 264, 266 connected to the network. However, it should be understood that the

databases may be hosted all on one server or on two servers, or even more than three servers.

One of the databases of the system 250 may contain information relating to one or more enzymes associated with a target organism that are
5 expressed at an elevated level in a pathological cell as compared to a normal counterpart or host cell. A second of the databases may contain information relating to one or more expressed enzymes associated with another class of organisms that are express at elevated levels in the particular class. The user's computer 242 may be utilized to compare the information obtained
10 from the databases.

Figure 8 illustrates an exemplary system 1200 with a plurality of components 1202 in accordance with an embodiment of the present invention. As shown, such components include a network 1204 which take any form including, but not limited to a local area network, a wide area
15 network such as the Internet, etc. Coupled to the network 1204 is a plurality of computers which may take the form of desktop computers 1206, laptop computers 1208, hand-held computers 1210, or any other type of computing hardware/software. As an option, the various computers may be connected to the network 1204 by way of a server 1212 which may be equipped with a
20 firewall for security purposes. It should be noted that any other type of hardware or software may be included in the system and be considered a component thereof.

A representative hardware environment associated with the various components of Figure 8 is depicted in Figure 9. In the present description,
25 the various sub-components of each of the components may also be considered components of the system. For example, particular software modules executed on any component of the system may also be considered components of the system. Figure 9 illustrates a typical hardware configuration of a workstation in accordance with one embodiment having a
30 central processing unit 1310, such as a microprocessor, and a number of other units interconnected via a system bus 1312.

The workstation shown in the figure includes a Random Access Memory (RAM) 1314, Read Only Memory (ROM) 1316, an I/O adapter 1318 for connecting peripheral devices such as disk storage units 1320 to the bus 1312, a user interface adapter 1322 for connecting a keyboard 1324, a mouse 1326, a speaker 1328, a microphone 1332, and/or other user interface devices such as a touch screen (not shown) to the bus 1312, communication adapter 1334 for connecting the workstation to a communication network 1335 (e.g., a data processing network) and a display adapter 1336 for connecting the bus 1312 to a display device 1338.

10

Software Implementation of the Methods and Systems

The workstation typically has resident thereon an operating system such as, for example: the Microsoft Windows NT or Windows 95/98/2000 Operating System (OS), the IBM OS/2 operating system, the MAC OS, or UNIX operating system. Those skilled in the art will appreciate that the present invention may also be implemented on platforms and operating systems other than those mentioned.

An embodiment may be written using JAVA, C, and the C++ language and utilizes object oriented programming methodology or any other means. Object oriented programming (OOP) has become increasingly used to develop complex applications. As OOP moves toward the mainstream of software design and development, various software solutions require adaptation to make use of the benefits of OOP. A need exists for these principles of OOP to be applied to a messaging interface of an electronic messaging system such that a set of OOP classes and objects for the messaging interface can be provided. OOP is a process of developing computer software using objects, including the steps of analyzing the problem, designing the system, and constructing the program. An object is a software package that contains both data and a collection of related structures and procedures. Since it contains both data and a collection of structures and procedures, it can be visualized as a self-sufficient component that does not

20
25
30

require other additional structures, procedures or data to perform its specific task. OOP, therefore, views a computer program as a collection of largely autonomous components, called objects, each of which is responsible for a specific task. This concept of packaging data, structures, and procedures
5 together in one component or module is called encapsulation.

In general, OOP components are reusable software modules which present an interface that conforms to an object model and which are accessed at run-time through a component integration architecture. A component integration architecture is a set of architecture mechanisms which allow
10 software modules in different process spaces to utilize each others capabilities or functions. This is generally done by assuming a common component object model on which to build the architecture. It is worthwhile to differentiate between an object and a class of objects at this point. An object is a single instance of the class of objects, which is often just called a
15 class. A class of objects can be viewed as a blueprint, from which many objects can be formed.

OOP allows the programmer to create an object that is a part of another object. For example, the object representing a piston engine is to have a composition-relationship with the object representing a piston. In
20 reality, a piston engine comprises a piston, valves and many other components; the fact that a piston is an element of a piston engine can be logically and semantically represented in OOP by two objects.

OOP also allows creation of an object that "depends from" another object. If there are two objects, one representing a piston engine and the
25 other representing a piston engine wherein the piston is made of ceramic, then the relationship between the two objects is not that of composition. A ceramic piston engine does not make up a piston engine. Rather it is merely one kind of piston engine that has one more limitation than the piston engine; its piston is made of ceramic. In this case, the object representing the
30 ceramic piston engine is called a derived object, and it inherits all of the aspects of the object representing the piston engine and adds further

limitation or detail to it. The object representing the ceramic piston engine “depends from” the object representing the piston engine. The relationship between these objects is called inheritance.

When the object or class representing the ceramic piston engine
5 inherits all of the aspects of the objects representing the piston engine, it inherits the thermal characteristics of a standard piston defined in the piston engine class. However, the ceramic piston engine object overrides these ceramic specific thermal characteristics, which are typically different from those associated with a metal piston. It skips over the original and uses new
10 functions related to ceramic pistons. Different kinds of piston engines have different characteristics, but may have the same underlying functions associated with it (e.g., how many pistons in the engine, ignition sequences, lubrication, etc.). To access each of these functions in any piston engine object, a programmer would call the same functions with the same names,
15 but each type of piston engine may have different/overriding implementations of functions behind the same name. This ability to hide different implementations of a function behind the same name is called polymorphism and it greatly simplifies communication among objects.

With the concepts of composition-relationship, encapsulation,
20 inheritance and polymorphism, an object can represent just about anything in the real world. In fact, one’s logical perception of the reality is the only limit on determining the kinds of things that can become objects in object-oriented software. Some typical categories are as follows:

- Objects can represent physical objects, such as automobiles in a
25 traffic-flow simulation, electrical components in a circuit-design program, countries in an economics model, or aircraft in an air-traffic-control system.
- Objects can represent elements of the computer-user environment such as windows, menus or graphics objects.
- 30 • An object can represent an inventory, such as a personnel file or a table of the latitudes and longitudes of cities.

- An object can represent user-defined data types such as time, angles, and complex numbers, or points on the plane.

With this enormous capability of an object to represent just about any logically separable matters, OOP allows the software developer to design and
5 implement a computer program that is a model of some aspects of reality, whether that reality is a physical entity, a process, a system, or a composition of matter. Since the object can represent anything, the software developer can create an object which can be used as a component in a larger software project in the future.

10 If 90% of a new OOP software program consists of proven, existing components made from preexisting reusable objects, then only the remaining 10% of the new software project has to be written and tested from scratch. Since 90% already came from an inventory of extensively tested reusable objects, the potential domain from which an error could originate is 10% of
15 the program. As a result, OOP enables software developers to build objects out of other, previously built objects.

This process closely resembles complex machinery being built out of assemblies and sub-assemblies. OOP technology, therefore, makes software engineering more like hardware engineering in that software is built from
20 existing components, which are available to the developer as objects. All this adds up to an improved quality of the software as well as an increased speed of its development.

Programming languages are beginning to fully support the OOP principles, such as encapsulation, inheritance, polymorphism, and
25 composition-relationship. With the advent of the C++ language, many commercial software developers have embraced OOP. C++ is an OOP language that offers a fast, machine-executable code. Furthermore, C++ is suitable for both commercial-application and systems-programming projects. For now, C++ appears to be the most popular choice among many OOP
30 programmers, but there is a host of other OOP languages, such as Smalltalk, Common Lisp Object System (CLOS), and Eiffel. Additionally, OOP

capabilities are being added to more traditional popular computer programming languages such as Pascal.

The benefits of object classes can be summarized, as follows:

- 5 • Objects and their corresponding classes break down complex programming problems into many smaller, simpler problems.
- Encapsulation enforces data abstraction through the organization of data into small, independent objects that can communicate with each other. Encapsulation protects the data in an object from accidental damage, but allows other objects to interact with that data by calling
10 the object's member functions and structures.
- Subclassing and inheritance make it possible to extend and modify objects through deriving new kinds of objects from the standard classes available in the system. Thus, new capabilities are created without having to start from scratch.
- 15 • Polymorphism and multiple inheritance make it possible for different programmers to mix and match characteristics of many different classes and create specialized objects that can still work with related objects in predictable ways.
- Class hierarchies and containment hierarchies provide a flexible
20 mechanism for modeling real-world objects and the relationships among them.
- Libraries of reusable classes are useful in many situations, but they also have some limitations. For example:
- Complexity. In a complex system, the class hierarchies for related
25 classes can become extremely confusing, with many dozens or even hundreds of classes.
- Flow of control. A program written with the aid of class libraries is still responsible for the flow of control (i.e., it must control the interactions among all the objects created from a particular library).
- 30 The programmer has to decide which functions to call at what times for which kinds of objects.

- Duplication of effort. Although class libraries allow programmers to use and reuse many small pieces of code, each programmer puts those pieces together in a different way. Two different programmers can use the same set of class libraries to write two programs that do exactly the same thing but whose internal structure (i.e., design) may be quite different, depending on hundreds of small decisions each programmer makes along the way. Inevitably, similar pieces of code end up doing similar things in slightly different ways and do not work as well together as they should.
- Class libraries are very flexible. As programs grow more complex, more programmers are forced to reinvent basic solutions to basic problems over and over again. A relatively new extension of the class library concept is to have a framework of class libraries. This framework is more complex and consists of significant collections of collaborating classes that capture both the small scale patterns and major mechanisms that implement the common requirements and design in a specific application domain. They were first developed to free application programmers from the chores involved in displaying menus, windows, dialog boxes, and other standard user interface elements for personal computers.
- Frameworks also represent a change in the way programmers think about the interaction between the code they write and code written by others. In the early days of procedural programming, the programmer called libraries provided by the operating system to perform certain tasks, but basically the program executed down the page from start to finish, and the programmer was solely responsible for the flow of control. This was appropriate for printing out paychecks, calculating a mathematical table, or solving other problems with a program that executed in just one way.
- The development of graphical user interfaces began to turn this procedural programming arrangement inside out. These interfaces allow the user, rather than program logic, to drive the program and decide when certain actions should be performed. Today, most personal computer software

accomplishes this by means of an event loop which monitors the mouse, keyboard, and other sources of external events and calls the appropriate parts of the programmer's code according to actions that the user performs. The programmer no longer determines the order in which events occur. Instead, a
5 program is divided into separate pieces that are called at unpredictable times and in an unpredictable order. By relinquishing control in this way to users, the developer creates a program that is much easier to use. Nevertheless, individual pieces of the program written by the developer still call libraries provided by the operating system to accomplish certain tasks, and the
10 programmer must still determine the flow of control within each piece after it's called by the event loop. Application code still "sits on top of" the system.

Even event loop programs require programmers to write a lot of code that should not need to be written separately for every application. The
15 concept of an application framework carries the event loop concept further. Instead of dealing with all the nuts and bolts of constructing basic menus, windows, and dialog boxes and then making these things all work together, programmers using application frameworks start with working application code and basic user interface elements in place. Subsequently, they build
20 from there by replacing some of the generic capabilities of the framework with the specific capabilities of the intended application.

Application frameworks reduce the total amount of code that a programmer has to write from scratch. However, because the framework is really a generic application that displays windows, supports copy and paste,
25 and so on, the programmer can also relinquish control to a greater degree than event loop programs permit. The framework code takes care of almost all event handling and flow of control, and the programmer's code is called only when the framework needs it (e.g., to create or manipulate a proprietary data structure).

30 A programmer writing a framework program not only relinquishes control to the user (as is also true for event loop programs), but also

relinquishes the detailed flow of control within the program to the framework. This approach allows the creation of more complex systems that work together in interesting ways, as opposed to isolated programs, having custom code, being created over and over again for similar problems.

5 Thus, as is explained above, a framework basically is a collection of cooperating classes that make up a reusable design solution for a given problem domain. It typically includes objects that provide default behavior (e.g., for menus and windows), and programmers use it by inheriting some of that default behavior and overriding other behavior so that the framework
10 calls application code at the appropriate times.

 There are three main differences between frameworks and class libraries:

- Behavior versus protocol. Class libraries are essentially collections of behaviors that you can call when you want those individual behaviors
15 in your program. A framework, on the other hand, provides not only behavior but also the protocol or set of rules that govern the ways in which behaviors can be combined, including rules for what a programmer is supposed to provide versus what the framework provides.
- 20 • Call versus override. With a class library, the programmer instantiates objects and calls their member functions. It is possible to instantiate and call objects in the same way with a framework (i.e., to treat the framework as a class library), but to take full advantage of a framework's reusable design, a programmer typically writes code that
25 overrides and is called by the framework. The framework manages the flow of control among its objects. Writing a program involves dividing responsibilities among the various pieces of software that are called by the framework rather than specifying how the different pieces should work together.
- 30 • Implementation versus design. With class libraries, programmers reuse only implementations, whereas with frameworks, they reuse

design. A framework embodies the way a family of related programs or pieces of software work. It represents a generic design solution that can be adapted to a variety of specific problems in a given domain.

For example, a single framework can embody the way a user interface works, even though two different user interfaces created with the same framework might solve quite different interface problems.

Thus, through the development of frameworks for solutions to various problems and programming tasks, significant reductions in the design and development effort for software can be achieved. A preferred embodiment of the invention utilizes HyperText Markup Language (HTML) to implement documents on the Internet together with a general-purpose secure communication protocol for a transport medium between the client and the Newco. HTTP or other protocols could be readily substituted for HTML without undue experimentation. Information on these products is available in T. Berners-Lee, D. Connolly, "RFC 1866: Hypertext Markup Language - 2.0" (Nov. 1995); and R. Fielding, H. Frystyk, T. Berners-Lee, J. Gettys and J.C. Mogul, "Hypertext Transfer Protocol -- HTTP/1.1: HTTP Working Group Internet Draft" (May 2, 1996). HTML is a simple data format used to create hypertext documents that are portable from one platform to another. HTML documents are SGML documents with generic semantics that are appropriate for representing information from a wide range of domains. HTML has been in use by the World-Wide Web global information initiative since 1990. HTML is an application of ISO Standard 8879; 1986 Information Processing Text and Office Systems; Standard Generalized Markup Language (SGML).

To date, Web development tools have been limited in their ability to create dynamic Web applications which span from client to server and interoperate with existing computing resources. Until recently, HTML has been the dominant technology used in development of Web-based solutions. However, HTML has proven to be inadequate in the following areas:

- Poor performance;
- Restricted user interface capabilities;

- Can only produce static Web pages;
- Lack of interoperability with existing applications and data; and
- Inability to scale.

Sun Microsystems's Java language solves many of the client-side
5 problems by:

- Improving performance on the client side;
- Enabling the creation of dynamic, real-time Web applications; and
- Providing the ability to create a wide variety of user interface
components.

10 With Java, developers can create robust User Interface (UI)
components. Custom "widgets" (e.g., real-time stock tickers, animated icons,
etc.) can be created, and client-side performance is improved. Unlike
HTML, Java supports the notion of client-side validation, offloading
appropriate processing onto the client for improved performance. Dynamic,
15 real-time Web pages can be created. Using the above-mentioned custom UI
components, dynamic Web pages can also be created.

Sun's Java language has emerged as an industry-recognized language
for "programming the Internet." Sun defines Java as: "a simple, object-
oriented, distributed, interpreted, robust, secure, architecture-neutral,
20 portable, high-performance, multithreaded, dynamic, buzzword-compliant,
general-purpose programming language. Java supports programming for the
Internet in the form of platform-independent Java applets." Java applets are
small, specialized applications that comply with Sun's Java Application
Programming Interface (API) allowing developers to add "interactive
25 content" to Web documents (e.g., simple animations, page adornments, basic
games, etc.). Applets execute within a Java-compatible browser (e.g.,
Netscape Navigator) by copying code from the server to client. From a
language standpoint, Java's core feature set is based on C++. Sun's Java
literature states that Java is basically, "C++ with extensions from Objective C
30 for more dynamic method resolution."

Another technology that provides similar function to JAVA is provided by Microsoft and ActiveX Technologies, to give developers and Web designers wherewithal to build dynamic content for the Internet and personal computers. ActiveX includes tools for developing animation, 3-D
5 virtual reality, video and other multimedia content. The tools use Internet standards, work on multiple platforms, and are being supported by over 100 companies. The group's building blocks are called ActiveX Controls, small, fast components that enable developers to embed parts of software in hypertext markup language (HTML) pages. ActiveX Controls work with a
10 variety of programming languages including Microsoft Visual C++, Borland Delphi, Microsoft Visual Basic programming system and, in the future, Microsoft's development tool for Java, code named "Jakarta." ActiveX Technologies also includes ActiveX Server Framework, allowing developers to create server applications. One of ordinary skill in the art readily
15 recognizes that ActiveX could be substituted for JAVA without undue experimentation to practice the invention.

iECTA Targets for Bacterial and Fungal Infections

In this embodiment of this invention, the method requires comparing the
20 results of a database search of enzymes expressed in an infected cell or by an infectious agent with a database search for enzymes expressed by a different class of organisms to identify an enzyme that is expressed in at least one class of organisms but not expressed in another class of organisms. In an alternative embodiment, additional organism can be searched. In a further embodiment,
25 the enzyme is overexpressed in the first class of organism as compared to the second class of organism or vice versa.

By searching the WIT database (now ERGO) EC 3.5.2.7 was found to occur in the genomes of a number of pathogenic organisms, including
Enterococcus faecalis, *Helicobacter pylori*, *Pseudomonas aeruginosa*, and
30 *Yersinia pestis*. The amino acid sequence of the enzyme was also obtained from this database, and by using the tBLASTn algorithm to search a database

with human gene sequences, it was found that the smallest sum probability 0.048 indicates that there is no human gene in the gene index that has a significant degree of similarity to the bacterial EC 3.5.2.7. This enzyme thus has no homolog in the human gene index, and is therefore a target ECTA enzyme.

Indeed, the practice of this method identified several hundred iECTA target enzymes from 51 pathogenic organisms (See Figure 7A and 7B, which list all the enzymes associated with all the currently annotated pathogens). Natural and ECTA substrates were identified for related groups or sub-classes of enzymes with specific examples detailed in order to exemplify, but not limit, the invention.

Beta-lactamase is an enzyme expressed by bacteria and its expression renders them resistant to beta-lactam antibiotics (Schaechter et al., 1993). Applicant previously identified this enzyme as an ECTA enzyme based on its overexpression as result of prior antibiotic therapy, see PCT Application No. PCT/US98/27493. Thus, in one aspect, beta-lactamase and peptide deformylase are specifically excluded as an iECTA enzyme.

However, the method of the present invention also identified beta-lactamase as an iECTA target enzyme. Other examples of pathogen-specific, drug resistance enzymes include resistance plasmid-encoded drug-modifying enzymes (e.g. chloramphenicol acetyl transferase and other plasmid- or chromosomally-encoded enzymes (Table 1, Part C).

Table 1, Parts B and C provides examples of enzyme targets for ECTA technology which suggest the utility of the ECTA approach in treating other diseases characterized by expression of pathogen specific enzymes.

Additional pathogen specific enzymes are listed in Table 1 (Part C), e.g., the two first enzymes of the branched chain amino acids (BCAA) pathway (acetolactate synthase and ketol-acid reductoisomerase). These enzymes are only functional in bacteria, fungi, and plants, not in humans or most animals (Whitcomb 1999, Chipman et al., 1998). ECTA compounds

targeting these enzymes will selectively attack infectious agents including bacteria and yeast with low toxicity to the host.

Selection of Favorable Reaction Type Using Enzyme Commission

5 Number

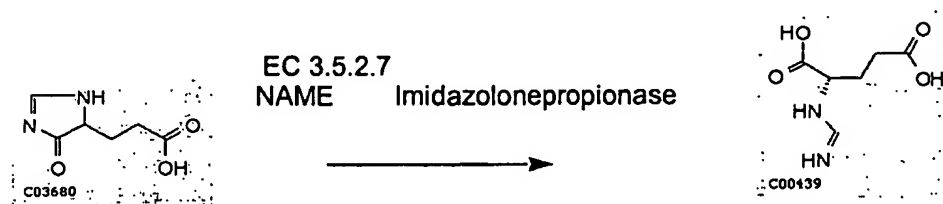
In one aspect, the invention provides a method of selecting iECTA targets by identifying pathogen encoded enzymes that catalyze favorable reaction types. This was accomplished by first selecting a specific enzyme that has been shown to be effective at metabolizing an ECTA substrate and
10 then using Enzyme Commission numbers to identify enzymes that catalyze a similar reaction in another microorganism. Comparison of the sequences of these pathogen encoded enzymes with a human gene index or by comparison of EC numbers with EC numbers (enzymes) found in humans or other higher organisms was then performed to select individual target enzymes that are
15 not present in human cells.

The International Enzyme Commission has developed a classification scheme that assigns each enzyme a unique number that specifies which of approximately 4500 distinct reaction types is catalyzed by the enzyme. This method is based on dividing enzyme catalyzed reactions into six classes, then
20 further subdividing each of these classes, and so on through four levels of classification.

It is desirable in identifying ECTA enzymes to search for specific reaction types or similar reaction types in annotated databases of microbial genomes, for example. The Enzyme Commission numbering system
25 provides a way of automating these searches. For example, beta-lactamase (EC 3.5.2.6) catalyzes a reaction that has proven to be amenable to development of ECTA substrates. Using this as an example, similar enzymes can be identified in target organisms by selecting EC numbers with varying degrees of similarity to find enzymes catalyzing similar reactions, i.e., the
30 hydrolysis of cyclic amides.

Since the EC classification system organizes reaction types using four levels, from most general to most similar, enzymes that catalyze similar reactions can be identified by varying the EC number for the last EC class number (i.e., the fourth number listed). An example is shown below where a

5 chemically similar but unique ECTA molecule can be created for an enzyme related to the known ECTA target beta-lactamase (EC 3.5.2.6)



Design of iECTA Prodrugs

- 10 Figures 7A and 7B list iECTA target enzymes. The enzymes are organized according to EC number. Enzymes that share the first 3 numbers carry out chemical reactions in a very similar fashion, they just use different substrates. Substrate prodrugs have been designed based on the "natural" generic substrate.
- 15 The prodrugs were designed by evaluating the enzyme mechanism to determine chemically the best position to substitute the natural substrate with an ECTA prototoxophore. The prototoxophore is chosen based upon the enzyme active site and how the natural substrate binds this site. The prototoxophore can be a simple leaving group appended onto the natural
- 20 substrate, but it does not necessarily resemble or mimic any or part of the natural substrate. The prototoxophore can be a reactive analogue of a natural fragmentation product that is released (unmasked) only after enzyme activation (for example see EC 4.1.3.27 anthranilate synthase). The prototoxophore can be a small chemical change to the natural substrate that
- 25 takes advantage of the natural movement of electrons to create a highly reactive and toxic product that resembles the natural product. As used below,

“unspecified” is intended to encompass all possible substituents, limited only by the laws of chemistry and physics and by what is tolerated by the ECTA enzyme target. The Enzyme Commission (EC) numbers define a specific enzyme reaction and therefore dictate the basic scaffold or substrate molecule to which substituents are added to create ECTA substrates or prodrugs. Although the toxin or toxoid is a specified substituent, Applicant intends that the toxin or toxoid be substituted at any appropriate atom on the compound, provided that the function of the compound is retained for its intended purpose.

10

EC 1 Oxidoreductases

All enzymes catalysing oxido-reductions belong to this class. The substrate oxidized is regarded as hydrogen or electron donor. The classification is based on 'donor:acceptor oxidoreductase'. The recommended name is 'dehydrogenase', wherever this is possible; as an alternative, 'acceptor reductase' can be used. 'Oxidase' is used only where O₂ is an acceptor. Classification is difficult in some cases, because of the lack of specificity towards the acceptor. A lack of specificity for the acceptor can be a major advantage when making unnatural (ECTA) substrates.

20

EC 1.1 Acting on the CH-OH group of donors

EC 1.1.1 With NAD or NADP as acceptor

EC 1.1.2 With a cytochrome as acceptor

EC 1.1.3 With oxygen as acceptor

25

EC 1.1.4 With a disulfide as acceptor

EC 1.1.5 With a quinone or similar compound as acceptor

EC 1.1.99 With other acceptors

EC 1.2 Acting on the aldehyde or oxo group of donors

EC 1.2.1 With NAD or NADP as acceptor

30

EC 1.2.2 With a cytochrome as acceptor

EC 1.2.3 With oxygen as acceptor

- EC 1.2.4 With a disulfide as acceptor
- EC 1.2.7 With an iron-sulfur protein as acceptor
- EC 1.2.99 With other acceptors
- EC 1.3 Acting on the CH-CH group of donors
 - 5 EC 1.3.1 With NAD or NADP as acceptor
 - EC 1.3.2 With a cytochrome as acceptor
 - EC 1.3.3 With oxygen as acceptor
 - EC 1.3.5 With a quinone or related compound as acceptor
 - EC 1.3.7 With an iron-sulfur protein as acceptor
 - 10 EC 1.3.99 With other acceptors
- EC 1.4 Acting on the CH-NH₂ group of donors
 - EC 1.4.1 With NAD or NADP as acceptor
 - EC 1.4.2 With a cytochrome as acceptor
 - EC 1.4.3 With oxygen as acceptor
 - 15 EC 1.4.4 With a disulfide as acceptor
 - EC 1.4.7 With an iron-sulfur protein as acceptor
 - EC 1.4.99 With other acceptors
- EC 1.5 Acting on the CH-NH group of donors
 - EC 1.5.1 With NAD or NADP as acceptor
 - 20 EC 1.5.3 With oxygen as acceptor
 - EC 1.5.4 With a disulfide as acceptor
 - EC 1.5.5 With a quinone or similar compound as acceptor
 - EC 1.5.99 With other acceptors
- EC 1.6 Acting on NADH or NADPH
 - 25 EC 1.6.1 With NAD or NADP as acceptor
 - EC 1.6.2 With a heme protein as acceptor
 - EC 1.6.4 With a disulfide as acceptor
 - EC 1.6.5 With a quinone or similar compound as acceptor
 - EC 1.6.6 With a nitrogenous group as acceptor
 - 30 EC 1.6.8 With a flavin as acceptor
 - EC 1.6.99 With other acceptors

- EC 1.7 Acting on other nitrogenous compounds as donors
 - EC 1.7.2 With a cytochrome as acceptor
 - EC 1.7.3 With oxygen as acceptor
 - EC 1.7.7 With an iron-sulfur protein as acceptor
 - 5 EC 1.7.99 With other acceptors
- EC 1.8 Acting on a sulfur group of donors
 - EC 1.8.1 With NAD or NADP as acceptor
 - EC 1.8.2 With a cytochrome as acceptor
 - EC 1.8.3 With oxygen as acceptor
 - 10 EC 1.8.4 With a disulfide as acceptor
 - EC 1.8.5 With a quinone as acceptor
 - EC 1.8.6 With nitrogenous group as acceptor
 - EC 1.8.7 With an iron-sulfur protein as acceptor
 - EC 1.8.99 With other acceptors
- 15 EC 1.9 Acting on a heme group of donors
 - EC 1.9.3 With oxygen as acceptor
 - EC 1.9.3.1 cytochrome-c oxidase
 - EC 1.9.3.2 Pseudomonas cytochrome oxidase
- 20 EC 1.10 Acting on diphenols and related substances as donors
 - EC 1.10.1 With NAD or NADP as acceptor
 - EC 1.10.2 With a cytochrome as acceptor
 - EC 1.10.3 With oxygen as acceptor
 - EC 1.10.99 With other acceptors
- 25 EC 1.11 Acting on a peroxide as acceptor
 - EC 1.11.1 Peroxidases
 - EC 1.11.1.1 NADH₂ peroxidase
 - EC 1.11.1.2 NADPH₂ peroxidase
 - EC 1.11.1.3 fatty-acid peroxidase
 - EC 1.11.1.4 now EC 1.13.11.11
 - 30 EC 1.11.1.5 cytochrome-c peroxidase
 - EC 1.11.1.6 catalase

- EC 1.11.1.7 peroxidase
- EC 1.11.1.8 iodide peroxidase
- EC 1.11.1.9 glutathione peroxidase
- EC 1.11.1.10 chloride peroxidase
- 5 EC 1.11.1.11 L-ascorbate peroxidase
- EC 1.11.1.12 phospholipid-hydroperoxide glutathione peroxidase
- EC 1.11.1.13 manganese peroxidase
- EC 1.11.1.14 diarylpropane peroxidase
- 10 EC 1.12 Acting on hydrogen as donor
 - EC 1.12.1 With NAD or NADP as acceptor
 - EC 1.12.2 With a cytochrome as acceptor
 - EC 1.12.7 With a iron-sulfur protein as acceptor
 - EC 1.12.99 With other acceptors
- 15 EC 1.13 Acting on single donors with incorporation of molecular oxygen (oxygenases)
 - EC 1.13.11 With incorporation of two atoms of oxygen
 - EC 1.13.12 With incorporation of one atom of oxygen (internal monooxygenases or internal mixed function oxidases)
 - 20 EC 1.13.99 Miscellaneous
- EC 1.14 Acting on paired donors, with incorporation or reduction of molecular oxygen
 - EC 1.14.11 With 2-oxoglutarate as one donor, and incorporation of one atom each of oxygen into both donors
 - 25 EC 1.14.12 With NADH₂ or NADPH₂ as one donor, and incorporation of two atoms of oxygen into one donor
 - EC 1.14.13 With NAD or NADH as one donor, and incorporation of one atom of oxygen
 - EC 1.14.14 With reduced flavin or flavoprotein as one donor, and incorporation of one atom of oxygen
 - 30

- EC 1.14.15 With reduced iron-sulfur protein as one donor, and
incorporation of one atom of oxygen
- EC 1.14.16 With reduced pteridine as one donor, and
incorporation of one atom of oxygen
- 5 EC 1.14.17 With reduced ascorbate as one donor, and
incorporation of one atom of oxygen
- EC 1.14.18 With another compound as one donor, and
incorporation of one atom of oxygen
- EC 1.14.99 Miscellaneous
- 10 EC 1.15 Acting on superoxide radicals as acceptor
- EC 1.15.1
- EC 1.15.1.1 Recommended name: superoxide
dismutase
- EC 1.16 Oxidising metal ions
- 15 EC 1.16.1 With NAD or NADP as acceptor
- EC 1.16.3 With oxygen as acceptor
- EC 1.17 Acting on CH₂ groups
- EC 1.17.1 With NAD or NADP as acceptor
- EC 1.17.3 With oxygen as acceptor
- 20 EC 1.17.4 With disulfide as acceptor
- EC 1.17.99 With other acceptors
- EC 1.18 Acting on reduced ferredoxin as donor
- EC 1.18.1 With NAD or NADP as acceptor
- EC 1.18.6 With dinitrogen as acceptor
- 25 EC 1.18.99 With H⁺ as acceptor
- EC 1.19 Acting on reduced flavodoxin as donor
- EC 1.19.6 With dinitrogen as acceptor
- EC 1.19.6.1 Recommended name: nitrogenase
(flavodoxin)
- 30 EC 1.97 Other oxidoreductases
- EC 1.97.1.1 chlorate reductase

- EC 1.97.1.2 pyrogallol hydroxyltransferase
- EC 1.97.1.3 sulfur reductase
- EC 1.97.1.4 formate acetyltransferase activating enzyme
- EC 1.97.1.5 arsenate reductase (glutaredoxin)
- 5 EC 1.97.1.6 arsenate reductase (donor)
- EC 1.97.1.7 methylarsonate reductase

EC 2: Transferases - All enzymes that catalyzes a process involving reactions in which groups are transferred belong to this group.

- 10 EC 2.1 Transferring one-carbon groups
 - EC 2.1.1 methyltransferases
 - EC 2.1.2 hydroxymethyl-, formyl- and related transferases
 - EC 2.1.3 carboxyl- and carbamoyltransferases
 - EC 2.1.4 amidinotransferases
- 15 EC 2.2 Transferring aldehyde or ketonic groups
 - EC 2.2.1 transketolases and transaldolases
 - EC 2.2.1.1 transketolase
 - EC 2.2.1.2 transaldolase
 - EC 2.2.1.3 formaldehyde transketolase
 - 20 EC 2.2.1.4 acetoin-ribose-5-phosphate transaldolase
- EC 2.3 Acyltransferases
 - EC 2.3.1 Transferring groups other than amino-acyl groups
 - EC 2.3.2 Aminoacyltransferases
- EC 2.4 Glycosyltransferases
 - 25 EC 2.4.1 Hexosyltransferases
 - EC 2.4.2 Pentosyltransferases
 - EC 2.4.99 Transferring Other Glycosyl Groups
- EC 2.5 Transferring alkyl or aryl groups, other than methyl groups
 - EC 2.5.1 mixed examples
- 30 EC 2.6 Transferring nitrogenous groups
 - EC 2.6.1 Transaminases

- EC 2.6.2 Amidinotransferases
- EC 2.6.3 Oximinotransferases
- EC 2.6.99 Transferring Other Nitrogenous Groups
- EC 2.7 Transferring phosphorus-containing groups
 - 5 EC 2.7.1 Phosphotransferases with an Alcohol Group as Acceptor
 - EC 2.7.2 Phosphotransferases with a carboxyl group as acceptor
 - EC 2.7.3 Phosphotransferases with a nitrogenous group as acceptor
 - 10 EC 2.7.4 Phosphotransferases with a phosphate group as acceptor
 - EC 2.7.5 Phosphotransferases with regeneration of donors, apparently catalysing intramolecular transfers
 - 15 EC 2.7.6 Diphosphotransferases
 - EC 2.7.7 Nucleotidyltransferases
 - EC 2.7.8 Transferases for other substituted phosphate groups
 - EC 2.7.9 Phosphotransferases with paired acceptors
- EC 2.8 Transferring sulfur-containing groups
 - 20 EC 2.8.1 Sulfurtransferases
 - EC 2.8.2 Sulfotransferases
 - EC 2.8.3 CoA-transferases
- EC 2.9 Transferring selenium-containing groups
 - EC 2.9.1 Selenotransferases
 - 25 EC 2.9.1.1 Recommended name: L-seryl-tRNA^{Sec} selenium transferase
- EC 3 Hydrolases This group includes any enzyme that catalyzes a process involving cleaving chemical groups with a molecule of water (excluding peptidases, see EC 3.4).
 - 30 EC 3.1 Acting on ester bonds
 - EC 3.1.1 Carboxylic Ester Hydrolases

- EC 3.1.2 Thiolester Hydrolases
- EC 3.1.3 Phosphoric Monoester Hydrolases
- EC 3.1.4 Phosphoric Diester Hydrolases
- EC 3.1.5 Triphosphoric Monoester Hydrolases
- 5 EC 3.1.6 Sulfuric Ester Hydrolases
- EC 3.1.7 Diphosphoric Monoester Hydrolases
- EC 3.1.8 Phosphoric Triester Hydrolases
- EC 3.1.11 Exodeoxyribonucleases Producing 5'-
Phosphomonoesters
- 10 EC 3.1.13 Exoribonucleases Producing 5'-Phosphomonoesters
- EC 3.1.14 Exoribonucleases Producing 3'-Phosphomonoesters
- EC 3.1.15 Exonucleases Active with either Ribo- or
Deoxyribonucleic Acids and Producing 5'-Phosphomonoesters
- EC 3.1.16 Exonucleases Active with either Ribo- or
15 Deoxyribonucleic Acids and Producing 3'-Phosphomonoesters
- EC 3.1.21 Endodeoxyribonucleases Producing 5'-
Phosphomonoesters
- EC 3.1.22 Endodeoxyribonucleases Producing other than 5'-
Phosphomonoesters
- 20 EC 3.1.25 Site-Specific Endodeoxyribonucleases Specific for
Altered Bases
- EC 3.1.26 Endoribonucleases Producing 5'-Phosphomonoesters
- EC 3.1.27 Endoribonucleases Producing other than 5'-
Phosphomonoesters
- 25 EC 3.1.30 Endoribonucleases Active with either Ribo- or
Deoxyribonucleic Acids and Producing 5'-Phosphomonoesters
- EC 3.1.31 Endoribonucleases Active with either Ribo- or
Deoxyribonucleic Acids and Producing 3'-Phosphomonoesters
- EC 3.2 Glycosylases
- 30 EC 3.2.1 Glycosidases, i.e. enzymes hydrolysing O- and S-
glycosyl compounds

- EC 3.2.2 Hydrolysing N-Glycosyl Compounds
- EC 3.2.3 Hydrolysing S-Glycosyl Compounds (discontinued)
- EC 3.3 Acting on ether bonds
 - EC 3.3.1 Trialkylsulfonium Hydrolases
 - 5 EC 3.3.2 Ether Hydrolases
- EC 3.4 Acting on peptide bonds (peptidases)
 - 3.4.11 Aminopeptidases
 - 3.4.13 Dipeptidases
 - 3.4.14 Dipeptidyl-peptidases and tripeptidyl-peptidases
 - 10 3.4.15 Peptidyl-dipeptidases
 - 3.4.16 Serine-type carboxypeptidases
 - 3.4.17 Metallocoarboxypeptidases
 - 3.4.18 Cysteine-type carboxypeptidases
 - 3.4.19 Omega peptidases
 - 15 3.4.21 Serine endopeptidases
 - 3.4.22 Cysteine endopeptidases
 - 3.4.23 Aspartic endopeptidases
 - 3.4.24 Metalloendopeptidases
 - 3.4.25 Threonine endopeptidases
 - 20 3.4.99 Endopeptidases of unknown catalytic mechanism
- EC 3.5 Acting on carbon-nitrogen bonds, other than peptide bonds
 - EC 3.5.1 In Linear Amides
 - EC 3.5.2 In Cyclic Amides
 - EC 3.5.3 In Linear Amidines
 - 25 EC 3.5.4 In Cyclic Amidines
 - EC 3.5.5 In Nitriles
 - EC 3.5.99 In Other Compounds
- EC 3.6 Acting on acid anhydrides
 - EC 3.6.1 In Phosphorus-Containing Anhydrides
 - 30 EC 3.6.2 In Sulfonyl-Containing Anhydrides

EC 3.6.3 Acting on acid anhydrides; catalysing transmembrane movement of substances

EC 3.6.4 Acting on acid anhydrides; involved in cellular and subcellular movement.

5 EC 3.7 Acting on carbon-carbon bonds

EC 3.7.1 In Ketonic Substances

EC 3.7.1.1 oxaloacetase

EC 3.7.1.2 fumarylacetoacetase

EC 3.7.1.3 kynureninase

10 EC 3.7.1.4 phloretin hydrolase

EC 3.7.1.5 acylpyruvate hydrolase

EC 3.7.1.6 acetylpyruvate hydrolase

EC 3.7.1.7 b-diketone hydrolase

EC 3.7.1.8 2,6-dioxo-6-phenylhexa-3-enoate hydrolase

15 EC 3.7.1.9 2-hydroxymuconate-semialdehyde hydrolase

EC 3.7.1.10 cyclohexane-1,3-dione hydrolase

EC 3.8 Acting on halide bonds

EC 3.8.1 In C-Halide Compounds

EC 3.9 Acting on phosphorus-nitrogen bonds

20 EC 3.9.1.1 Recommended name: phosphoamidase

EC 3.10 Acting on sulfur-nitrogen bonds

EC 3.10.1.1 N-sulfoglucosamine sulfohydrolase

EC 3.10.1.2 cyclamate sulfohydrolase

EC 3.11 Acting on carbon-phosphorus bonds

25 EC 3.11.1.1 phosphonoacetaldehyde hydrolase

EC 3.11.1.2 phosphonoacetate hydrolase

EC 3.12 Acting on sulfur-sulfur bonds

EC 3.12.1.1 Recommended name: trithionate hydrolase

EC 4 Lyases

30 Lyases are enzymes cleaving C-C, C-O, C-N and other bonds by means other than by hydrolysis or oxidation. They differ from other enzymes in that

two substrates are involved in one reaction direction, but only one in the other direction. When acting on the single substrate, a molecule is eliminated and this generates either a new double bond or a new ring. The systematic name is formed according to 'substrate group-lyase'. In recommended names, expressions like decarboxylase, aldolase, etc. are used. 'Dehydratase' is used for those enzymes eliminating water. In cases where the reverse reaction is the more important, or the only one to be demonstrated, 'synthase' may be used in the name.

EC 4.1 Carbon-carbon lyases

- 10 EC 4.1.1 Carboxy-Lyases
- EC 4.1.2 Aldehyde-Lyases
- EC 4.1.3 Oxo-Acid-Lyases
- EC 4.1.99 Other Carbon-Carbon Lyases

EC 4.2 Carbon-oxygen lyases

- 15 EC 4.2.1 Hydro-Lyases
- EC 4.2.2 Acting on Polysaccharides
- EC 4.2.99 Other Carbon-Oxygen Lyases

EC 4.3 Carbon-nitrogen lyases

- 20 EC 4.3.1 Ammonia-Lyases
- EC 4.3.2 Amidine-Lyases
- EC 4.3.3 Amine-Lyases
- EC 4.3.99 Other Carbon-Nitrogen Lyases

EC 4.4 Carbon-sulfur lyases

- 25 EC 4.4 Carbon-Sulfur Lyases
- EC 4.5 Carbon-Halide Lyases
- EC 4.6 Phosphorus-Oxygen Lyases
- EC 4.99 Other Lyases

EC 4.5 Carbon-halide lyases

- 30 EC 4.5.1.1 DDT-dehydrochlorinase
- EC 4.5.1.2 3-chloro-D-alanine dehydrochlorinase
- EC 4.5.1.3 dichloromethane dehalogenase

- EC 4.5.1.4 L-2-amino-4-chloropent-4-enoate
dehydrochlorinase
- EC 4.5.1.5 S-carboxymethylcysteine synthase
- EC 4.6 Phosphorus-oxygen lyases
 - 5 EC 4.6.1.1 adenylate cyclase
 - EC 4.6.1.2 guanylate cyclase
 - EC 4.6.1.6 cytidylate cyclase
- EC 4.99 Other lyases
 - EC 4.99.1.1 ferrochelataase
 - 10 EC 4.99.1.2 alkylmercury lyase
- EC 5 Isomerases
 - EC 5.1 Racemases and epimerases
 - EC 5.1.1 Acting on Amino Acids and Derivatives
 - EC 5.1.2 Acting on Hydroxy Acids and Derivatives
 - 15 EC 5.1.3 Acting on Carbohydrates and Derivatives
 - EC 5.1.99 Acting on Other Compounds
 - EC 5.2 cis-trans-Isomerases
 - EC 5.2.1.1 maleate isomerase
 - EC 5.2.1.2 maleylacetoacetate isomerase
 - 20 EC 5.2.1.3 retinal isomerase
 - EC 5.2.1.4 maleylpyruvate isomerase
 - EC 5.2.1.5 linoleate isomerase
 - EC 5.2.1.6 furylfuramide isomerase
 - EC 5.2.1.7 retinol isomerase
 - 25 EC 5.2.1.8 peptidylprolyl isomerase
 - EC 5.2.1.9 farnesol 2-isomerase
 - EC 5.2.1.10 2-chloro-4-carboxymethylenebut-2-en-1,4-olide
isomerase
 - EC 5.2.1.11 4-hydroxyphenylacetaldehyde-oxime isomerase
 - 30 EC 5.3 Intramolecular isomerases
 - EC 5.3.1 Interconverting Aldoses and Ketoses

- EC 5.3.2 Interconverting Keto- and Enol-Groups
- EC 5.3.3 Transposing C=C Bonds
- EC 5.3.4 Transposing S-S Bonds
- EC 5.3.99 Other Intramolecular Oxidoreductases
- 5 EC 5.4 Intramolecular transferases (mutases)
 - EC 5.4.1 Transferring Acyl Groups
 - EC 5.4.2 Phosphotransferases (Phosphomutases)
 - EC 5.4.3 Transferring Amino Groups
 - EC 5.4.99 Transferring Other Groups
- 10 EC 5.5 Intramolecular lyases
 - EC 5.5.1.1 muconate cycloisomerase
 - EC 5.5.1.2 3-carboxy-cis,cis-muconate cycloisomerase
 - EC 5.5.1.3 tetrahydroxypteridine cycloisomerase
 - EC 5.5.1.4 inositol-phosphate synthase
 - 15 EC 5.5.1.5 carboxy-cis,cis-muconate cyclase
 - EC 5.5.1.6 chalcone isomerase
 - EC 5.5.1.7 chloromuconate cycloisomerase
 - EC 5.5.1.8 geranyl-diphosphate cyclase
 - EC 5.5.1.9 cycloeucalenol cycloisomerase
 - 20 EC 5.5.1.10 a-pinene-oxide decyclase
 - EC 5.5.1.11 dichloromuconate cycloisomerase
- EC 5.99 Other isomerases
 - EC 5.99.1.1 thiocyanate isomerase
 - EC 5.99.1.2 DNA topoisomerase
 - 25 EC 5.99.1.3 DNA topoisomerase (ATP-hydrolysing)
- EC 6 Ligases
 - EC 6.1 Forming carbon-oxygen bonds
 - EC 6.1.1 Ligases Forming Aminoacyl-tRNA and Related Compounds
 - 30 EC 6.2 Forming carbon-sulfur bonds
 - EC 6.2.1 Acid-Thiol Ligases

EC 6.3 Forming carbon-nitrogen bonds

EC 6.3.1 Acid-Ammonia (or Amide) Ligases (Amide Synthases)

EC 6.3.2 Acid-D-Amino-Acid Ligases (Peptide Synthases)

5 EC 6.3.3 Cyclo-Ligases

EC 6.3.4 Other Carbon-Nitrogen Ligases

EC 6.3.5 Carbon-Nitrogen Ligases with Glutamine as Amido-N-Donor

EC 6.4 Forming carbon-carbon bonds

10 EC 6.4.1.1 pyruvate carboxylase

EC 6.4.1.2 acetyl-CoA carboxylase

EC 6.4.1.3 propionyl-CoA carboxylase

EC 6.4.1.4 methylcrotonoyl-CoA carboxylase

EC 6.4.1.5 geranoyl-CoA carboxylase

15 EC 6.5 Forming phosphoric ester bonds

EC 6.5.1.1 DNA ligase (ATP)

EC 6.5.1.2 DNA ligase (NAD)

EC 6.5.1.3 RNA ligase (ATP)

EC 6.5.1.4 RNA-3'-phosphate cyclase

20

Biological Confirmation - Enzyme Assays

Also provided by this invention is a cell-free assay to confirm the efficacy of iECTA prodrugs by contacting the prodrug and enzyme in a cell-free system under conditions that favor activation of the prodrug by the enzyme.

25 The enzymes and methods for expression of enzyme nucleic acids are known in the art, and therefore need not be reproduced herein. For example, all enzyme sequence information and reaction conditions are available online at one or more of the following sites: www.Brenda.bc.uni-koeln.de/ and www.expasy.ch/enzyme. As an example only, coding sequences for bacterial or fungal AcLS and KARI are cloned as described (Pang and Duggleby

30 (1999); Poulsen and Stougaard (1989); and Hill et al. (1997)) and expressed

in *E. coli* using an appropriate promoter system (Sambrook, et al. *supra*). Enzyme is purified using the "His-tag" system (Stratagene, La Jolla, CA). Enzyme assay for AcLS is done by methods described by Epelbaum, et al. (1998) and others (e.g., Hill, et al. (1997)). Cloning, expression and
5 purification of KARI is as described by Hill and Duggleby (1999). Assays for KARI will be done similarly to those described by Epelbaum, et al. (1996) and Hill and Duggleby (1999).

This invention provides a method for confirming therapeutic potential for the treatment of infectious disease. The agent is considered a potential
10 therapeutic agent if proliferation and/or replication of the infectious agent or the host cell are reduced relative to the cells in a control sample. Most preferably, the infectious agent is killed by the agent. Infected cells can be procaryotic (bacterial such as *E. coli*) or eucaryotic. The cells can be mammalian or non-mammalian cells, e.g., yeast cells, murine cells, rat cells,
15 avian cells, human cells.

This invention also provides a quick and simple screening assay that will enable initial identification of compounds with at least some of the desired characteristics. In one aspect, the assay requires two cell types, the first being a control cell in which the target enzyme is not expressed or does
20 not contain the infectious agent, or is expressed at a low level. The second cell type is the test cell, in which the target enzyme is expressed at a detectable level, e.g., a high level or a sample that contains the infectious agent. In a separate embodiment, a counterpart genetically modified to differentially express the target enzyme, or enzymes (containing the
25 appropriate species of target enzyme) is used. More than one species of enzyme can be used to separately transfect separate host cells, so that the effect of the candidate drug on a target enzyme can be simultaneously compared to its effect on another enzyme or a corresponding enzyme from another species.

30 In another embodiment, a third target cell is used as a control because it receives an effective amount of a compound, such as, for example, the

compounds shown below, which have been shown to be potent prodrugs. This embodiment is particularly useful to screen for new agents that are activated by iECTA enzymes.

5 ***In Vivo* Testing for Preclinical Efficacy of iECTA Prodrugs**

The *in vitro* assays are confirmed in animal or plant models infected with a pathogen expressing the target enzyme to determine *in vivo* efficacy. *In vivo* practice of the invention in an animal such as a rat or mouse provides a convenient animal model system that can be used prior to clinical testing of the therapeutic agent or prodrug. In this system, a potential prodrug will be successful if microbial load is reduced or the symptoms of the infection are ameliorated, each as compared to an untreated, infected animal. It also can be useful to have a separate negative control group of cells or animals which has not been infected, which provides a basis for comparison.

15 When practiced *in vivo*, the candidate prodrug is administered or delivered to the animal in effective amounts. As used herein, the term "administering" for *in vivo* and *ex vivo* purposes means providing the subject with an effective amount of the candidate prodrug effective to reduce microbial load. In these instances, the agent or prodrug may be administered with a pharmaceutically acceptable carrier. The agents, prodrugs and compositions of the present invention can be used in the manufacture of medicaments and for the treatment of humans and other animals by administration in accordance with conventional procedures, such as an active ingredient in pharmaceutical compositions.

25 Another aspect of this invention is a method for treating a subject or alleviating the symptoms of an infection by a pathogen in a subject, wherein the pathogen or a pathogen infected cell expresses an iECTA enzyme by delivering to the subject an effective amount of an iECTA prodrug compound that is converted to a toxin by the iECTA enzyme. Further provided is a method of treating a disease associated with an infection with a pathogen expressing an iECTA enzyme, or an infected host cell expressing an iECTA

enzyme, by delivering to the subject an effective amount of an iECTA prodrug compound that is converted to a toxin by the iECTA enzyme. Examples of iECTA expressing pathogens and the corresponding diseases and symptoms caused by infection by these microorganisms, are provided in

5 Table 3, below. Yet further provided is a method for producing a medicament to treat a subject as indicated above, comprising combining an effective amount of a suitable iECTA prodrug and a pharmaceutically acceptable carrier.

10

Table 3

<i>iECTA Expressing Microorganism</i>	<i>Disease or Symptom Caused by Infection</i>
Gram-Positive	
<i>Staphylococcus aureus</i>	major human pathogen, bacteremia, pneumonia
<i>Staphylococcus epidermidis</i> and other coagulase-negative staphylococci	urinary tract infections, osteomyelitis, bacteremia
<i>Streptococcus pyogenes</i>	bacteremia, lymphagitis, pneumonia
<i>Streptococcus pneumoniae</i>	pneumonia, otitis media, sinusitis
<i>Streptococcus agalactiae</i>	primary bacteremia, pneumonia, endocarditis, osteomyelitis
<i>Enterococcus species</i>	urinary tract infections, bacteremia, endocarditis, intra-abdominal and pelvic infections, neonatal sepsis
Gram-Negative	
<i>Neisseria gonorrhoeae</i>	genital infection, perihepatitis
<i>Moraxella catarrhalis</i>	otitis media, lower respiratory tract infections, pneumonia, bacteremia
<i>Campylobacter jejuni</i>	acute enteritis, acute colitis, bacteremia
<i>Enterobacteriaceae</i> (including <i>Escherichia</i> , <i>Salmonella</i> , <i>Klebsiella</i> , <i>Enterobacter</i>)	enteric infections, urinary tract infections, respiratory infections, bacteremia
<i>Pseudomonas aeruginosa</i>	endocarditis, respiratory infections, bacteremia, central nervous system infections
<i>Acinetobacter species</i>	respiratory tract infections, bacteremia, genitourinary
<i>Haemophilus influenzae</i>	meningitis, epiglottitis, pneumonia, bacteremia

This invention also provides a method for treating or protecting plants from infection by applying an effective amount of the iECTA prodrug compound to the foliage, roots or the soil surrounding the plants or roots.

- 5 These isolated compounds can be combined with known pesticides or insecticides.

Compounds within the present invention when used to treat or protect plants from infections, they can be formulated as wettable powders, granules and the like, or can be microencapsulated in a suitable medium and the like.

- 10 Examples of other formulations include, but are not limited to soluble powders, wettable granules, dry flowables, aqueous flowables, wettable dispersible granules, emulsifiable concentrates and aqueous suspensions. Other suitable formulations will be known to those skilled in the art.

- This invention further provides a method for administering the
15 prodrug compound to fish in an amount effective to either prevent or treat an infection. The compound may be administered by incorporating the compound into the food supply for the fish. Alternatively, the compound may be added to the water in which fish live, or are contained within. Finally, the compound may be administered to the fish as a suitable
20 pharmaceutical preparation. Other suitable formulations will be known to those skilled in the art.

- When the iECTA prodrug compound is delivered to a subject such as a mouse, a rat or a human patient, the agent can be added to a pharmaceutically acceptable carrier and systemically or topically
25 administered to the subject.

- Animal models that can be used to test utility of candidate iECTA compounds set forth below have been described in the literature. Examples include animal models of infection by *Staphylococcus aureus* (Josefsson and Tartowski (1999) and Totsuka, et al. (1999)), *Pneumocystis carinii*
30 (Tamburrini, et al. (1999)), enterococci (Zimbelman, et al. (1999)), multimicrobial peritonitis (Montravers, et al. (1999)), and fungal infections

(Louie, et al. (1999)). In each case the candidate iECTA compound is compared with an antibiotic currently used to treat the disease. These experiments also provide the first test of therapeutic index. No toxicity of the candidate iECTA compound should be seen at doses necessary for
5 eradication or control of disease. Preferably, doses that cause toxicity will be at least ten-fold higher than the doses needed for control or cure of the disease.

Administration *in vivo* can be effected in one dose, continuously or intermittently throughout the course of treatment. Methods of determining
10 the most effective means and dosage of administration are well known to those of skill in the art and will vary with the composition used for therapy, the purpose of the therapy, the target cell being treated, and the subject being treated. Single or multiple administrations can be carried out with the dose level and pattern being selected by the treating physician. Suitable dosage
15 formulations and methods of administering the agents can be found below.

The agents and compositions of the present invention can be used in the manufacture of medicaments and for the treatment of humans and other animals by administration in accordance with conventional procedures, such as an active ingredient in pharmaceutical compositions.

20 The pharmaceutical compositions can be administered orally, intranasally, parenterally or by inhalation therapy, and may take the form of tablets, lozenges, granules, capsules, pills, ampoules, suppositories or aerosol form. They may also take the form of suspensions, solutions and emulsions of the active ingredient in aqueous or nonaqueous diluents, syrups, granulates
25 or powders. In addition to a compound of the present invention, the pharmaceutical compositions can also contain other pharmaceutically active compounds or a plurality of compounds of the invention.

More particularly, a compound of the formula of the present invention also referred to herein as the active ingredient, may be administered for
30 therapy by any suitable route including oral, rectal, nasal, topical (including transdermal, aerosol, buccal and sublingual), vaginal, parenteral (including

subcutaneous, intramuscular, intravenous and intradermal) and pulmonary. It will also be appreciated that the preferred route will vary with the condition and age of the recipient, and the disease being treated.

In general, a suitable dose for each of the above-named compounds, is
5 in the range of about 1 to about 100 mg per kilogram body weight of the recipient per day, preferably in the range of about 1 to about 50 mg per kilogram body weight per day and most preferably in the range of about 1 to about 25 mg per kilogram body weight per day. Unless otherwise indicated, all weights of active ingredient are calculated as the parent compound of the
10 formula of the present invention, for salts or esters thereof, the weights would be increased proportionately. The desired dose is preferably presented as two, three, four, five, six or more sub-doses administered at appropriate intervals throughout the day. These sub-doses may be administered in unit dosage forms, for example, containing about 1 to about 100 mg, preferably
15 about 1 to above about 25 mg, and most preferably about 5 to above about 25 mg of active ingredient per unit dosage form. It will be appreciated that appropriate dosages of the compounds and compositions of the invention may depend on the type and severity and stage of the disease and can vary from patient to patient. Determining the optimal dosage will generally
20 involve the balancing of the level of therapeutic benefit against any risk or deleterious side effects of the treatments of the present invention.

Ideally, the prodrug should be administered to achieve peak concentrations of the active compound at sites of disease. This may be achieved, for example, by the intravenous injection of the prodrug, optionally
25 in saline, or orally administered, for example, as a tablet, capsule or syrup containing the active ingredient. Desirable blood levels of the prodrug may be maintained by a continuous infusion to provide a therapeutic amount of the active ingredient within disease tissue. The use of operative combinations is contemplated to provide therapeutic combinations requiring
30 a lower total dosage of each component antiviral agent than may be required

when each individual therapeutic compound or drug is used alone, thereby reducing adverse effects.

While it is possible for the prodrug ingredient to be administered alone, it is preferable to present it as a pharmaceutical formulation comprising at least one active ingredient, as defined above, together with one or more pharmaceutically acceptable carriers, therefore, and optionally other therapeutic agents. Each carrier must be "acceptable" in the sense of being compatible with the other ingredients of the formulation and not injurious to the patient.

Formulations include those suitable for oral, rectal, nasal, topical (including transdermal, buccal and sublingual), vaginal, parenteral (including subcutaneous, intramuscular, intravenous and intradermal) and pulmonary administration. The formulations may conveniently be presented in unit dosage form and may be prepared by any methods well known in the art of pharmacy. Such methods include the step of bringing into association the active ingredient with the carrier which constitutes one or more accessory ingredients. In general, the formulations are prepared by uniformly and intimately bringing into association the active ingredient with liquid carriers or finely divided solid carriers or both, and then if necessary shaping the product.

Formulations of the present invention suitable for oral administration may be presented as discrete units such as capsules, cachets or tablets, each containing a predetermined amount of the active ingredient; as a powder or granules; as a solution or suspension in an aqueous or non-aqueous liquid; or as an oil-in-water liquid emulsion or a water-in-oil liquid emulsion. The active ingredient may also be presented a bolus, electuary or paste.

A tablet may be made by compression or molding, optionally with one or more accessory ingredients. Compressed tablets may be prepared by compressing in a suitable machine the active ingredient in a free-flowing form such as a powder or granules, optionally mixed with a binder (e.g., povidone, gelatin, hydroxypropylmethyl cellulose), lubricant, inert diluent,

preservative, disintegrant (e.g., sodium starch glycolate, cross-linked povidone, cross-linked sodium carboxymethyl cellulose) surface-active or dispersing agent. Molded tablets may be made by molding in a suitable machine a mixture of the powdered compound moistened with an inert liquid
5 diluent. The tablets may optionally be coated or scored and may be formulated so as to provide slow or controlled release of the active ingredient therein using, for example, hydroxypropylmethyl cellulose in varying proportions to provide the desired release profile. Tablets may optionally be provided with an enteric coating, to provide release in parts of the gut other
10 than the stomach.

Formulations suitable for topical administration in the mouth include lozenges comprising the active ingredient in a flavored basis, usually sucrose and acacia or tragacanth; pastilles comprising the active ingredient in an inert basis such as gelatin and glycerin, or sucrose and acacia; and mouthwashes
15 comprising the active ingredient in a suitable liquid carrier.

Pharmaceutical compositions for topical administration according to the present invention may be formulated as an ointment, cream, suspension, lotion, powder, solution, paste, gel, spray, aerosol or oil. Alternatively, a formulation may comprise a patch or a dressing such as a bandage or
20 adhesive plaster impregnated with active ingredients and optionally one or more excipients or diluents.

For diseases of the eye or other external tissues, e.g., mouth and skin, the formulations are preferably applied as a topical ointment or cream containing the active ingredient in an amount of, for example, about 0.075 to
25 about 20% w/w, preferably about 0.2 to about 25% w/w and most preferably about 0.5 to about 10% w/w. When formulated in an ointment, the prodrug may be employed with either a paraffinic or a water-miscible ointment base. Alternatively, the prodrug ingredients may be formulated in a cream with an oil-in-water cream base.

30 If desired, the aqueous phase of the cream base may include, for example, at least about 30% w/w of a polyhydric alcohol, i.e., an alcohol

having two or more hydroxyl groups such as propylene glycol, butane-1,3-diol, mannitol, sorbitol, glycerol and polyethylene glycol and mixtures thereof. The topical formulations may desirably include a compound which enhances absorption or penetration of the prodrug ingredient through the skin
5 or other affected areas. Examples of such dermal penetration enhancers include dimethylsulfoxide and related analogues.

The oily phase of the emulsions of this invention may be constituted from known ingredients in a known manner. While this phase may comprise merely an emulsifier (otherwise known as an emulgent), it desirably
10 comprises a mixture of at least one emulsifier with a fat or an oil or with both a fat and an oil. Preferably, a hydrophilic emulsifier is included together with a lipophilic emulsifier which acts as a stabilizer. It is also preferred to include both an oil and a fat. Together, the emulsifier(s) with or without stabilizer(s) make up the so-called emulsifying wax, and the wax
15 together with the oil and/or fat make up the so-called emulsifying ointment base which forms the oily dispersed phase of the cream formulations.

Emulgents and emulsion stabilizers suitable for use in the formulation of the present invention include Tween 60, Span 80, cetostearyl alcohol, myristyl alcohol, glyceryl monostearate and sodium lauryl sulphate.

20 The choice of suitable oils or fats for the formulation is based on achieving the desired cosmetic properties, since the solubility of the active compound in most oils likely to be used in pharmaceutical emulsion formulations is very low. Thus, the cream should preferably be a non-greasy, non-staining and washable product with suitable consistency to avoid leakage
25 from tubes or other containers. Straight or branched chain, mono- or dibasic alkyl esters such as di-isoadipate, isocetyl stearate, propylene glycol diester of coconut fatty acids, isopropyl myristate, decyl oleate, isopropyl palmitate, butyl stearate, 2-ethylhexyl palmitate or a blend of branched chain esters known as Crodamol CAP may be used, the last three being preferred esters.
30 These may be used alone or in combination depending on the properties

required. Alternatively, high melting point lipids such as white soft paraffin and/or liquid paraffin or other mineral oils can be used.

Formulations suitable for topical administration to the eye also include eye drops wherein the active ingredient is dissolved or suspended in a suitable carrier, especially an aqueous solvent for the prodrug ingredient. The prodrug ingredient is preferably present in such formulation in a concentration of about 0.5 to about 20%, advantageously about 0.5 to about 10% particularly about 1.5% w/w.

Formulations for rectal administration may be presented as a suppository with a suitable base comprising, for example, cocoa butter or a salicylate.

Formulations suitable for vaginal administration may be presented as suppositories, tampons, creams, gels, pastes, foams or spray formulations containing in addition to the prodrug ingredient, such carriers as are known in the art to be appropriate.

Formulations suitable for nasal administration, wherein the carrier is a solid, include a coarse powder having a particle size, for example, in the range of about 20 to about 500 microns which is administered in the manner in which snuff is taken, i.e., by rapid inhalation through the nasal passage from a container of the powder held close up to the nose. Suitable formulations wherein the carrier is a liquid for administration as, for example, nasal spray, nasal drops, or by aerosol administration by nebulizer, include aqueous or oily solutions of the prodrug ingredient.

Formulations suitable for parenteral administration include aqueous and non-aqueous isotonic sterile injection solutions which may contain antioxidants, buffers, bacteriostats and solutes which render the formulation isotonic with the blood of the intended recipient; and aqueous and non-aqueous sterile suspensions which may include suspending agents and thickening agents, and liposomes or other microparticulate systems which are designed to target the compound to blood components or one or more tissues. The formulations may be presented in unit-dose or multi-dose sealed

containers, for example, ampoules and vials, and may be stored in a freeze-dried (lyophilized) condition requiring only the addition of the sterile liquid carrier, for example water for injections, immediately prior to use.

Extemporaneous injection solutions and suspensions may be prepared from
5 sterile powders, granules and tablets of the kind previously described.

Preferred unit dosage formulations are those containing a daily dose or unit, daily subdose, as herein above-recited, or an appropriate fraction thereof, of a prodrug ingredient.

It should be understood that in addition to the ingredients particularly
10 mentioned above, the formulations of this invention may include other agents conventional in the art having regard to the type of formulation in question, for example, those suitable of oral administration may include such further agents as sweeteners, thickeners and flavoring agents.

Prodrugs and compositions of the formula of the present invention
15 may also be presented for the use in the form of veterinary formulations, which may be prepared, for example, by methods that are conventional in the art.

Agricultural Applications

20 Some embodiments are useful in agriculture. Accordingly, this invention also provides a composition comprising the compound of this invention and a carrier, such as a solvent or agriculturally suitable carrier. In a further embodiment, the composition includes at least one chemical or biological pesticide, or both, as is conventionally used in the art.

25 For ease of application to plants or plant roots, the formulations can be processed into a formulation selected from the group consisting of a wettable powder, an aqueous suspension, an emulsifiable concentrate and a microencapsulated formulation.

Thus, the compounds of this invention can be used in a method for
30 protecting or treating a plant or plant root from pathogenic infestations by applying an effective amount of the compound to the plant or root. In one

aspect, the method further comprises applying at least one chemical or biological pesticide.

The following examples are intended to illustrate, but not limit the invention.

5

Experiment # 1 – Identification of iECTA Enzyme Targets

Alternative #1

The query method involves:

1. Go to WIT ("What Is There") site on the Internet: At the time of
10 the filing of this application, the WIT site was at the URL,
<http://wit.mcs.anl.gov/WIT2/CGI/search.cgi?user=>.
2. Select "General Search," check "All Enzymes," and select "Match
the Exact String" "." (i.e. consisting only of a full stop). This will output all
EC numbers in the microbial database when the maximum output table
15 length is specified to be greater than the then-current maximum EC number.
For example, as of the filing of the first priority application on July 20, 2000,
there were 3,546 enzymes listed in the EC database. The entire list of EC
numbers could be output, therefore, by specifying the maximum output table
length as any number greater than or equal to 3,546 (e.g., 10,000).
- 20 3. Select and copy all EC numbers and enzyme names to a Microsoft
Word (or similar) document, and sort the EC numbers in order to get a useful
list of names.
4. Paste the EC numbers and enzyme names into the KEGG form at:
http://www.blast.genome.ad.jp/kegg-bin/mk_point_html?ec. This will
25 search enzymes in the pathway database by EC numbers.
5. Select "Homo sapiens" from the pull-down menu and choose to
"Display EC number(s) NOT found in the search." This will output a list of
enzymes identified by EC numbers, as well as a list of enzyme names. This
initial output indicates the input enzymes on the KEGG metabolic map
30 outlined in red that are characterized as NOT being present in human cells.
Input enzymes that are present in human cells are outlined in red with a green

fill. Because the descriptions of all genomes are incomplete at present, this is a list of candidate iECTA targets present in non-human species.

Alternative #2 (as shown in Figure 2C):

- 5 1. Go to Genomes Online Homepage, ERGO, on the internet:
2. <http://wit.integratedgenomics.com/IGwit/CGI/examine.cgi?user=>
3. Select general search, select a target organism or homo sapiens
select ORFS (open reading frames), and select match EC" " (i.e., EC
space). This will output all EC numbers in the microbial database
10 corresponding to the target organism when the maximum output table
length is selected to be 10,000. In the example, the list for individual
pathogenic organisms have been combined to give a list consisting of
8,162 open reading frames that have been annotated as enzymes with
defined EC numbers. This list can be copied and pasted into the
15 KEGG form as described in step 4 of Alternative #1 in order to obtain
a metabolic map with pathogen enzymes outlined in red, and human
enzymes filled with green.

Alternative #3 (as shown in Figure 2C):

- 20 1. Go to WIT (What Is There) site on the internet:
2. <http://wit.mcsanl.gov/WIT2/CGI/search.cgi?user=>
3. Select general search, select a target organism, select ORFS (open
reading frames), and select match EC" " (i.e., EC space). This will
output all EC numbers in the microbial database corresponding to the
25 target organism when the maximum output table length is selected to
be 10,000. For example, the list for individual pathogenic organisms
have been combined to give a list consisting of 8,162 open reading
frames that have been annotated as enzymes with defined EC
numbers. Alternatively, a separate list of EC numbers can be compiled
30 for each organism individually by selecting a single organism at a
time.

4. Open the file as a Microsoft Word (or similar word processing program), and process the text until the EC numbers are listed in a column separated by linefeed characters. This can be done (for example), by using the Replace function of the word processor to replace "EC" with "^IEC" to list all EC numbers at the left margin, and to replace all whitespace.
5. Next, set the indentation to place all EC numbers in a column. Select the column, copy and paste to a new document. Delete "(EC" using the Replace function of the word processor program, delete all spaces, and replace all instances of "^ I^I" with " ^I". Likewise, replace all instances of "^p^p" with "^p".
6. Copy the resulting column of numbers to a Simpletext or other text based word processor file that is recognized by a PERL or other computer language interpreter, and name the file "target_ec_num".
7. Go to the SRS data integration page maintained by the European Bioinformatics Institute currently at <http://srs6.ebi.ac.uk/srs6bin/cgi-bin/wgetz?-page+top+-newId>. Use the SRS interface to query a database representing enzymes expressed in humans. For example, the BRENDA database can be downloaded in this way by querying for [Organism] Human|homo sapiens AND [EC number]*. The resulting list of EC numbers is most conveniently saved as a text file, opened in Microsoft Word (or similar word processing program) and processed as in steps 3) through 6) above; save the final text file as human_ec_num.
8. A list of enzymes occurring in the target organism, but not in humans, or other species or combination of species can be obtained by running a computer program written in PERL or other computer language. The program can be re-run to delete enzymes present in any number of databases by re-applying step 8) using another database. For example, the SwissProt database human enzymes can be subtracted as

well as the BRENDA database. Alternatively, the SwissProt and BRENDA lists can be combined, and the program run just once.

The following illustrative PERL program was used to obtain the list of enzymes set forth in step 8:

```

5       To delete known human enzymes, as represented by enzyme
commission (EC numbers) from lists of enzyme commission numbers
comprising a number of pathogenic microorganisms. In this example, the
lists of EC numbers for pathogenic organisms and Homo sapiens were
downloaded from the Integrated Genomics website
10    (http://wit.integratedgenomics.com/GOLD/), the website for the European
Bioinformatics Institute (http://www.ebi.ac.uk/genomes/).

#!/usr/bin/perl;

open (HUMAN_EC_NUM, "human_ec_num"); # input human EC numbers
15 while (<HUMAN_EC_NUM>) {
    chomp;

    push (@human_ec_list, $_); #store the numbers in a list
}

20 open (TARGET_EC_NUM, "target_ec_num"); #input target EC numbers
while (<TARGET_EC_NUM>) {
    chomp;

    push (@target_ec_list, $_); #store target EC numbers in a list
}

25 while (@human_ec_list) { #compare each human EC number with
    $a = pop (@human_ec_list); #each target EC number

    foreach (@target_ec_list) {
        if ($_ eq $a) {          #if the the target EC number matches
            s/$a/ERGO/;          #replace with the string ERGO
30    }
    }
}

print "ECTA EC numbers are: \n"; #print the list to the screen
open (OUT, ">target_ec_numbers"); #save the list to a file
35 foreach (@target_ec_list) {
    print (OUT $_);

```

```

        print (OUT "\n");
        print "$_\n";
    }
    close (OUT) || die "can't close";

```

5

The output of the program in step 8 lists all ECTA targets, whether or not they are part of a recognized metabolic pathway; enzymes present in BRENDA (Homo sapiens and other mammals, in this instance) and SwissProt (Homo sapiens) can be indicated.

- 10 A list of enzymes organized into metabolic pathways can be obtained from the resulting total target_ec_num_ list by pasting this list into the KEGG website <http://www.blast.genome.ad.jp/kegg/kegg2.html>, selecting the organism homo sapiens, selecting Display EC/Compound/Gene(s) NOT found in the search, and clicking execute. ECTA enzymes that cannot be
- 15 placed in a metabolic pathway by KEGG will be listed apart from those organized into metabolic pathways.

Alternative #4

1. Download the list of all existing EC numbers defined by the International Union of Biochemistry and Molecular Biology. For
- 20 example, the current list can be obtained by going to the nomenclature site of the IUBMC at <http://www.chem.qmw.ac.uk/iubmb/>, and saving a text file containing a list of each of the six enzyme categories, concatenating these files, then removing all characters from the file
- 25 except the EC numbers using a wordprocessing program such as Microsoft Word.

2. "Dehumanize" the list of EC numbers by subtracting ERGO human EC numbers, BRENDA human EC numbers, and SwissProt human EC numbers by running the PERL program listed in
- 30 Alternative #2 to delete human EC numbers.

3. Identify microbial enzymes by using the "dehumanized" EC number list to select "hits" in a file created by concatenating the annotated EC numbers and enzyme descriptions for target organisms (alternatively, each target organism can be analyzed individually). In this example, a file consisting of the EC numbers and descriptions comprising 51 microbial genomes representing human microbial pathogens is first catenated with the following PERL script:

```
#!/usr/bin/perl -w

#catenates text files listed below:

10 @ARGV = ("Yersinia pseudotubercul", "Yersinia pestis", "Vibrio cholerae
    El Tor N16961", "Ureaplasma urealyticum", "Treponema pallidum", "
    Streptomyces coelicolor", " Streptomyces coelicolor", "Streptococcus
    pyogenes", "Streptococcus pneumonia", "Streptococcus mutans",
    "Streptococcus equi", "Staphylococcus aureus", "Salmonella typhimurium",
15 "Salmonella typhi", "Salmonella paratyphi", "Salmonella enteritidis",
    "Salmonella dublin", "Saccharomyces cerevisia", "Rickettsia prowazekii",
    "Pseudomonas aeruginosa", "Porphyromonas gingivalis", "Pasteurella
    multocida", "Neurospora crassa", "Neisseria meningitidis ser. B ", "Neisseria
    meningitidis ser. A ", "Neisseria gonorrhoeae", "Mycoplasma pneumoniae",
20 "Mycoplasma genitalium", "Mycobacterium tuberculosis", "Mycobacterium
    leprae", "Mycobacterium bovis", "Klebsiella pneumoniae", "Helicobacter
    pylori", "Helicobacter pylori J99", "Haemophilus influenzae", "Haemophilus
    ducreyi", "Escherichia coli", "Enterococcus faecium (DOE)", "Enterococcus
    faecalis", "Corynebacterium diphthe", "Clostridium difficile", "Clostridium
    acetobutyli", "Chlamydia trachomatis D", " Chlamydia trachomatis M",
25 "Chlamydia pneumoniae AR39", "Chlamydia pneumoniae CWL029",
    "Campylobacter jejuni", "Borrelia burgdorferi", "Bordetella pertussis",
    "Bordetella bronchiseptica", "Bacillus subtilis");

    open (OUT, ">outfile"); #Outfile is the catenated file

30 while (<>) {

        print $_;

        print OUT $_;

    }

35 Close (OUT)||die "can't close";
```

4. Once the files containing EC numbers and enzyme descriptions for target microorganisms are catenated, the enzymes not occurring in humans can be selected by running another PERL program using the "dehumanized"
- 5 EC numbers as input (EC numbers are converted from 1.1.1.1 to 1_1_1_1 format by replacing "." with "_" before running this program):

```
#!/usr/bin/perl -w

10  #This program outputs EC Enzyme Descriptions for microorganisms, as
    shown in 5a

    #The EC numbers represent enzymes that do not occur in humans

15  open (TARGET_EC_NUM, "Dehuman EC nums clean");
    open (OUT,">All pathogen ECTA LIST");
    while (<TARGET_EC_NUM>) {
        chomp;

20          push (@target_ec_list, $_);
    }

    %seen = ();

25  foreach $item (@target_ec_list) {
        push (@uniq, $item) unless $seen{$item}++;
    }

30  @target_ec_list = @uniq;
    @target_ec_list = reverse(@target_ec_list);

    while (@target_ec_list) {

35          $a = pop (@target_ec_list);

        open (PATHOGEN_EC_LIST,"KITTY EC LIST TEXT copy");
        while (<PATHOGEN_EC_LIST>) {

40            if (/^b$a\b/) {
```

```

        print "$a $_";
        print OUT "$a $_";
5      }
      }

    }

10  close (OUT) ||die "can't close";

```

The output of this program is given in Figure 7A, which lists the EC numbers and descriptions of ECTA enzymes for each target organism. An abbreviated list consisting of all the EC number descriptions, but listing only one occurrence for each organism is shown in Figure 7B, and consists of the 673 enzymes indicated by the following PERL script:

```

#!/usr/bin/perl -w

20  open (TARGET_EC_NUM, "Dehuman EC nums clean");
    open (OUT,">All pathogen ECTA LIST");
    while (<TARGET_EC_NUM>) {
        chomp;

25      push (@target_ec_list, $_);
    }

    %seen = ();

30  foreach $item (@target_ec_list) {
        push (@uniq, $item) unless $seen{$item}++;
    }

35  @target_ec_list = @uniq;
    @target_ec_list = reverse(@target_ec_list);

    while (@target_ec_list) {

40      $a = pop (@target_ec_list);
        $b = $a;

```

```

open (PATHOGEN_EC_LIST,"KITTY EC LIST TEXT copy");
    while (<PATHOGEN_EC_LIST>) {

    if ($a eq $b){
5    if (/^b$a\b/) {

        print "$a $_";
        print OUT "$a $_";
10        b = $_;

    }
    }
    }
15 }

close (OUT) || die "can't close";

```

20 The methods of this invention provide the following unexpected advantages over prior art methods:

1. By taking the intersection of data sets from two different sources, a new data set is generated with useful properties that may contain enzymes or enzyme types that are present in pathogenic or undesirable microorganisms, but not present in uninfected or host cells.
- 25 2. Although the method makes use of an existing data set that returns enzyme names and EC numbers in response to a search tool, the use of a computer algorithm to return all enzyme names which identify potential iECTA enzyme targets, by EC number, in pathogenic organisms is an innovation that can be broadly applied for identifying pathogen or species

30 targets for therapeutics development, or other applications (e.g., discriminating between yeast and bacteria, and pathogenic vs. nonpathogenic bacteria, plant pests vs. food plants).
3. Because the data sets for total microbial enzymes are subject to change as new enzyme genes are discovered, the method described above can

35 continue to identify "new" iECTA targets.

Although the method has been illustrated by examples applicable to iECTA, the method is not limited to iECTA. For example, databases of

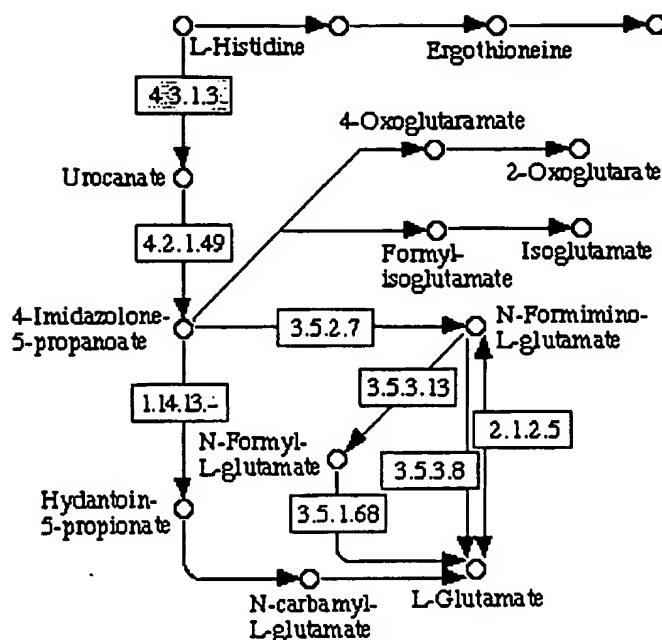
enzymes elevated or expressed only in human cancer cells as compared to normal cells can be identified in an analogous fashion. For example, target enzymes for ECTA in cancer are expressed at elevated levels in tumor tissue as compared to normal tissue. Examples of such enzymes are given in Table 1(A). The difference in target enzyme expression between normal and tumor tissue allows for a positive therapeutic index to be achieved with ECTA compounds. Using this approach, the ECTA compound NB1011 (See U.S. Patent No. 6,245,750) targets the enzyme thymidylate synthase (TS) which is overexpressed in cancer cells. Cytotoxicity of NB1011 is proportional to TS protein levels in model cell-based systems. TS inhibitors such as 5-fluorouridine have the reverse cytotoxicity profile since they are more toxic to the cells which express low amounts of the enzyme (Copur et al., 1995). *In vivo* studies have demonstrated efficacy against colon and breast cancer in animal models with little or no toxicity to the host.

15

Experiment # 2 -Analysis of Metabolic Networks

In selecting ECTA target enzymes it is useful to analyze the metabolic pathways and the networks of pathways in which particular potential target enzymes occur. For example, imidazolone propionase is shown here to be on the metabolic map relating to histidine degradation, in which boxes colored green (present as shaded in black and white reproductions) represent enzymes known (according to current information represented in the Kyoto Encyclopedia of Genes and Genomes) to occur in humans, and the proposed target enzyme, 3.5.2.7.

20

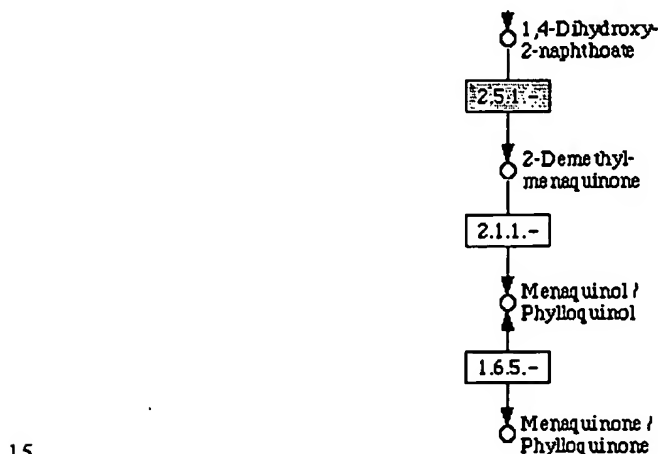


This map illustrates an aspect of ECTA enzyme selection, i.e. that it is desirable for the ECTA target enzyme to be connected to the network in such a way that there are no enzymes occurring in humans that are connected to the substrate (in this case, 4-imidazolone 5-propionate). This ensures that any ECTA substrate is unlikely to interact with a human enzyme. This condition is met in the above example, since 4.2.1.49 and 1.14.13.- are both represented by unfilled boxes. EC numbers 4.3.1.3; 4.2.1.49; 1.14.13.-; 3.5.2.7; 3.5.1.68 and 3.5.3.8 have been identified with open reading frames in *P. aeruginosa* according to the WIT database, while only 4.3.1.3 was also found in humans.

Another example of selection of an intrinsic ECTA target by identification of an enzyme that catalyzes a favorable reaction type is methyl transferase. The methyl transferase enzyme thymidylate synthase has been shown to be amenable to development of ECTA substrates. A search of the WIT database for alternative related enzymes identified 2-demethylmenaquinone methyl transferase, EC 2.1.1.- as a potential intrinsic ECTA target.

In bacteria, the S-adenosylmethionine dependent 2-demethylmenaquinone methyl transferase catalyzes a step in the biosynthesis of menaquinone, or vitamin K₂. A number of pathogenic bacteria express this enzyme, including *Escherichia coli*, *Enterococcus faecalis*, *Haemophilus influenza*, *Mycobacterium leprae*, *Mycobacterium tuberculosis*, *Pseudomonas aeruginosa*, and *Yersinia pestis*. The reaction catalyzed by this enzyme involves the transfer of a methyl group, and is similar in this respect to thymidylate synthase, EC 2.1.1.45.

A tBLASTn search indicates that there is no human gene in the TIGR (The Institute for Genomic Research) human gene index that has a statistically significant degree of similarity to the S-adenosylmethionine dependent 2-demethylmenaquinone methyl transferase. This result is also consistent with the pathway data obtained from the Kyoto Encyclopedia of Genes and Genomes.



Enzyme EC 2.1.1.- is present in the target organism (*Pseudomonas aeruginosa*), but not in humans. 2.5.1.- represents an enzyme that is present in humans. The pathway has no branches, thus the substrate 2-demethylmenaquinone is not expected to be a substrate for any human enzymes and is a useful target for development of ECTA compounds.

Experiment # 3 - Designing iECTA Compounds for Bacterial and Fungal Infections Using Enzymes in the Branched Chain Amino Acids Pathway

Using the above method, the enzymes acetolactate synthase (AcLS) or
5 ketol-acid reductoisomerase (KARI) were identified as target enzymes.

These two enzymes are preferred targets for iECTA because they are specific
to the Branched Chain Amino Acid ("BCAA") pathway which itself is
specific to bacteria, fungi, and plants. Acetolactate synthase (AcLS) is the
first enzyme in the pathway of branched chain amino acid (BCAA) synthesis.
10 The active enzyme is present in bacteria, fungi, and plants, but not in
mammals (Shaner and Singh (1997)). The absence of AcLS in animals
allows effective use of AcLS inhibitors in herbicides, while avoiding toxicity
to humans and animals (Shaner and Singh (1997) and Grandoni, et al.
(1998)). Selectivity of enzyme function between disease causing organisms
15 and animal or plant hosts can be used for designing iECTA compounds to
fight bacterial and fungal infections. The product(s) may include toxins or
antimetabolites that are preferentially generated by the bacteria or fungi.

Acetolactate synthase (AcLS) is an $\alpha_2\beta_2$ oligomer that consists of
four subunits: two catalytic subunits with molecular weight of 60 kD and two
20 regulatory subunits with molecular weight of 10-17 kDa (Pang and Duggleby
(1999)). The enzyme catalyzes two similar reactions: the condensation of
two pyruvate molecules to yield 2-acetolactate (Figure 11), and the
condensation of pyruvate with 2-oxobutyrate (2-OB, 2-ketobutyrate) to yield
2-aceto-2-hydroxybutyrate (Figure 12). Thiamine pyrophosphate (TPP) is a
25 cofactor in the reaction. Another cofactor, flavin adenine dinucleotide
(FAD), is also necessary to maintain the catalytic structure of the enzyme
(Shaner and Singh (1997)). The mechanism of AcLS reactivity with
pyruvate and 2-OB is shown in Figure 5. Figure 6 is a comparison of 2-OB
metabolism in *E. coli* and humans. AcLS is inhibited by BCAA feedback
30 inhibition and a number of heterocyclic compounds, some of which are
currently used as herbicides (Figure 10) (Shaner and Singh (1997)). The

crystal structure of AcLS is not yet available, but molecular modeling of the AcLS active site based on the structure of AcLS homologues, including pyruvate decarboxylase and pyruvate oxidase, has been completed (Ibdah, et al. (1996) and Chipman, et al. (1998)). Results show the existence of a deep
5 substrate binding pocket with the cofactor binding at the bottom of the pocket. Site directed mutagenesis revealed that some herbicides (e.g., sulfonylurea; Figure 10) bind close to the "entrance" of the pocket (Chipman, et al. (1998) and Chang and Duggleby (1998)). Branched chain amino acids inhibit the enzyme by an allosteric mechanism since they do not occupy the
10 substrate binding site, but rather a distinct site between the two subunits (Shaner and Singh (1997)). AcLS inhibitors are effective as herbicides at low concentrations and have little toxicity to humans (Whitcomb (1999)).

KARI follows AcLS in the pathway of branched chain amino acid synthesis. It catalyzes isomerization of 2-acetolactate or 2-aceto-2-
15 hydroxybutyrate with concomitant hydride transfer. The products of the reaction are 2,3-dihydroxy-isovalerate and 2,3-dihydroxy-3-methyl-valerate, respectively. The mechanism of the reaction is known in the art (Aulabaugh and Schloss (1990)). For catalysis, the enzyme requires Mg^{2+} , which is involved in substrate binding, and NADPH, which is necessary to carry out
20 the reductase function of KARI. KARI inhibitors include analogs of the transition state of the reaction (Halgand, et al. (1999)). Because the crystal structure of KARI is known (Halgand, et al. (1999)), this information can be used to aid the design of KARI iECTA compounds using simulated docking technology (Kirkpatrick, et al. (1999)).

25

Experiment # 4 - Designing iECTA Prodrugs to Target Enzymes

The following discussion is intended to illustrate, but not limit the invention. The natural substrates for AcLS are pyruvate or 2-oxobutyrate (2-OB). In designing possible iECTA molecules to target AcLS, the principal
30 substrates and cofactors that are involved in the reaction were analyzed with respect to the criteria listed in Figures 2A and 2B and the metabolism of 2-

OB in humans and *E. coli* were compared. Modifications of 2-oxobutyrate may be good candidates for AcLS ECTA compounds. 2-oxobutyrate (2-OB) is involved in few defined pathways. AcLS catalyzes condensation of 2-OB with the pyruvate in the first step in branched chain amino acid synthesis giving rise to Isoleucine. To enter this pathway a 2-OB derivative is required that is not significantly toxic by itself but can become toxic following reaction with AcLS. One possible fate of the product of the AcLS reaction with its ECTA molecule is that it can act as an inhibitor of ketol acid reductoisomerase (KARI), the next enzyme in the pathway of BCAA synthesis. Alternatively, ECTA compounds like derivatives of 2-OB may be incorporated into proteins by organisms with active AcLS. This would result in pathogen-specific metabolic poisoning of the pathogen (bacteria, yeast) and may also be effective for herbicidal activity. A summary of this analysis is given in Table 3, below.

15

Table 4: Possible Pyrimidyl Compounds to Be Used as ECTA
Compounds for AcLS

Reactant	Potential as an ECTA Substrate	Rationale
Thiamine pyrophosphate (TPP-cofactor)	Limited	Lack of specificity. TPP interacts with multiple enzymes, including enzymes present in animals. Alternatives in TPP could therefore impact host systems.
Branched chain amino acids	Limited	Natural product. More likely to inhibit the reaction of AcLS.
AcLS inhibitors (Herbicides): <ul style="list-style-type: none"> • Imidazolinones • Pyrimidylthio-benzoates • Sulfonylamino-carbonyltriazolinones • Sulfonylureas 	Limited	Not processed into product by AcLS.
Pyruvate	Limited	Good substrate since it undergoes decarboxylation on the first step of reaction. In the normal pathway, A) two molecules of pyruvate are condensed in the first step of the BCAA pathway which gives rise to Valine; and B) one

Reactant	Potential as an ECTA Substrate	Rationale
		molecule is combined with a molecule of 2-oxobutyrate to give rise to Isoleucine. However, it is a "common substrate" in the cell, is involved in many metabolic pathways (reacts with at least 10 different enzymes including enzymes present in mammals).
2-oxobutyrate (2-OB)	A leading candidate as scaffold for AcLS ECTA compound	Modifications of 2-oxobutyrate may be good candidates for AcLS ECTA compounds. 2-oxobutyrate (2-OB) is involved in few defined pathways. AcLS catalyzes condensation of 2-OB with the pyruvate in the first step in branched chain amino acid synthesis giving rise to Isoleucine. To enter this pathway we need a 2-OB derivative that is not significantly toxic by itself but can become toxic following reaction with AcLS. One possible fate of the product of the AcLS reaction with its ECTA molecule is that it can act as an inhibitor of ketol acid reductoisomerase (KARI), the next enzyme in the pathway of BCAA synthesis. Alternatively, ECTA compounds like derivatives of 2-OB may be incorporated into proteins by organisms with active AcLS. This would result in pathogen-specific metabolic poisoning of the pathogen (bacteria, yeast) and may also be effective for herbicidal activity.

Such iECTA compounds will have therapeutic antimicrobial (and possible herbicidal) properties. Proposed pathways of metabolism for AcLS iECTA compounds derived from 2-OB are compared for humans and

5 bacteria as shown in Figure 6. In humans and bacteria, cystathionine-2-lyase catalyzes 2-oxobutyrate conversion to L-homoserine and L-cystathionine. In bacteria, two additional enzymatic reactions can occur. These are reactions of 2-OB with 1-aminocyclopropane-1-carboxylate deaminase and

acetolactate synthase. The structure of a potential AcLS iECTA compound is

10 disclosed *infra*. The tri-substitution of carbon-4 of 2-OB, where carbon-4 is CX₃ and where X ≠ H, is one of the key features in this design because it

channels the iECTA compound toward reaction with AcLS, and prevents its reaction with cystathionine-2-lyase or 1-aminocyclopropane-1-carboxylate deaminase.

Once the iECTA compound is processed by AcLS, the fate of the product of the reaction may be different from that of the natural substrate. The AcLS iECTA product may:

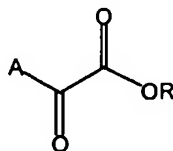
1. Bind to KARI and be converted to the rearranged and reduced product. This product could be toxic, or become transformed to a toxin following a subsequent reaction.
2. It may not bind to KARI, but rather accumulate as a "dead-end" product and eventually starve the cells of pyruvate.
3. Be incorporated into cellular polypeptides, thereby leading to the formation of dysfunctional proteins.

The design of candidate KARI iECTA compounds is based upon the same rationale as the design of AcLS iECTA compounds. In this case, the proposed scaffold is 2-aceto-2-hydroxybutyrate.

Either AcLS or KARI will utilize substrates and convert them to antimetabolites targeting multiple enzyme pathways.

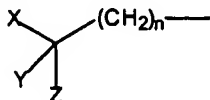
Experiment # 5 - Synthesis of iECTA Compounds

This invention also provides compounds useful as AcLS and KARI iECTA compounds. In one aspect, the compounds have the structure:



wherein A is a substituted or unsubstituted phenyl ring; or a substituted

$>C=C<$ more preferably $-CH=CH-$, substituents can include a substituted or unsubstituted aromatic or heteraromatic ring, more preferably a substituted or unsubstituted phenyl ring; or



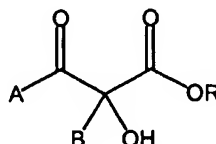
5

wherein n is 0 or an integer from 1 to 6, more preferably n is 0, 1, or 2, most preferably n is 0;

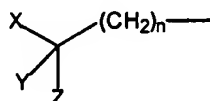
wherein X is H or halogen, more preferably halogen; Y is H or
 10 halogen, more preferably halogen; and Z is any of H; halogen; CF_3 ; aliphatic group; substituted or unsubstituted aromatic or heteraromatic ring, more preferably phenyl ring; substituted or unsubstituted aromatic carbonyl or heteraromatic carbonyl, more preferably substituted or unsubstituted benzoyl.

In all cases $R = \text{H}$, a pharmaceutically acceptable cation, or an
 15 aliphatic substituent, more preferably methyl or ethyl.

In another aspect, the compounds have the structure:



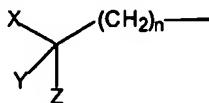
20 wherein A is a substituted or unsubstituted phenyl ring or a substituent having the structure:



25 wherein n is 0 or an integer from 1 to 6, and more preferably 0, 1 or 2, and most preferably 0; wherein X is H or halogen, and more preferably

halogen; wherein Y is H or halogen, and more preferably halogen; wherein Z is H; halogen; CF₃; aliphatic group; substituted or unsubstituted aromatic or heteraromatic ring, and more preferably phenyl ring; substituted or unsubstituted aromatic carbonyl or heteraromatic carbonyl, more preferably substituted or unsubstituted benzoyl.

B is a substituted or unsubstituted phenyl ring or a substituent having the structure:



10

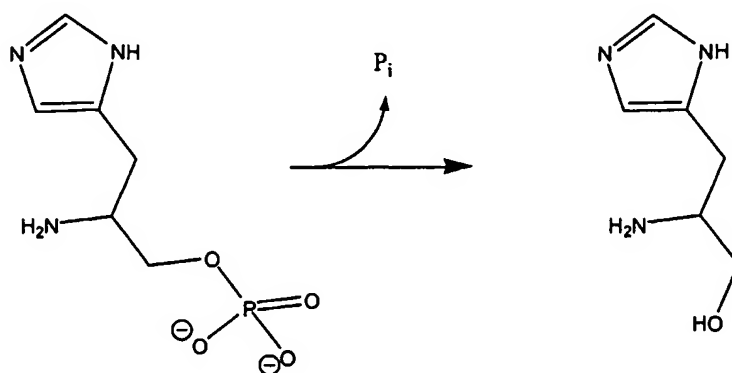
wherein n is 0 or an integer from 1 to 6, and more preferably 0, 1 or 2, and most preferably 0; wherein X is H or halogen, and more preferably halogen; wherein Y is H or halogen, and more preferably halogen; wherein Z is H; halogen; CF₃; aliphatic group; substituted or unsubstituted aromatic or heteraromatic ring, and more preferably phenyl ring; substituted or unsubstituted aromatic carbonyl or heteraromatic carbonyl, more preferably substituted or unsubstituted benzoyl.

In all cases R is H, a pharmaceutically acceptable cation, or an aliphatic substituent, more preferably methyl or ethyl.

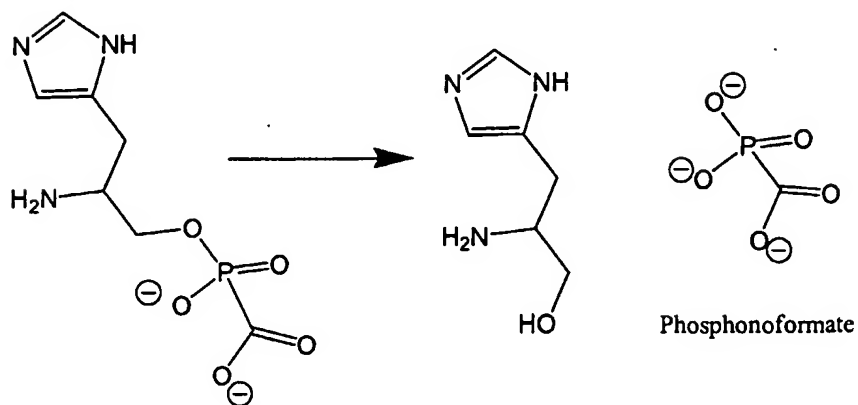
Biological activity similar to iECTA compounds for AcLS and KARI has not been ascribed to any known drugs. However, the literature has provided a synthetic protocol for a possible candidate-compound. (Wakselman and Tordeuz (1982)). This paper describes synthesis of 3,3,3-trifluoropropionic and 4,4,4-trifluoro-2-ketobutyric acids. This synthetic protocol does not describe the synthesis of all compounds of the class identified above, but is easily adapted by those of skill in the art for this purpose.

EC 3.1.3.15 Histidinol Phosphatase

Histidinol phosphatase is found on the histidine biosynthetic pathway
5 and is found in bacteria and yeast, but not in mammals. Mechanism is
simply water hydrolysis of a phosphate group.



10

Histidinol Phosphatase iECTA Substrate

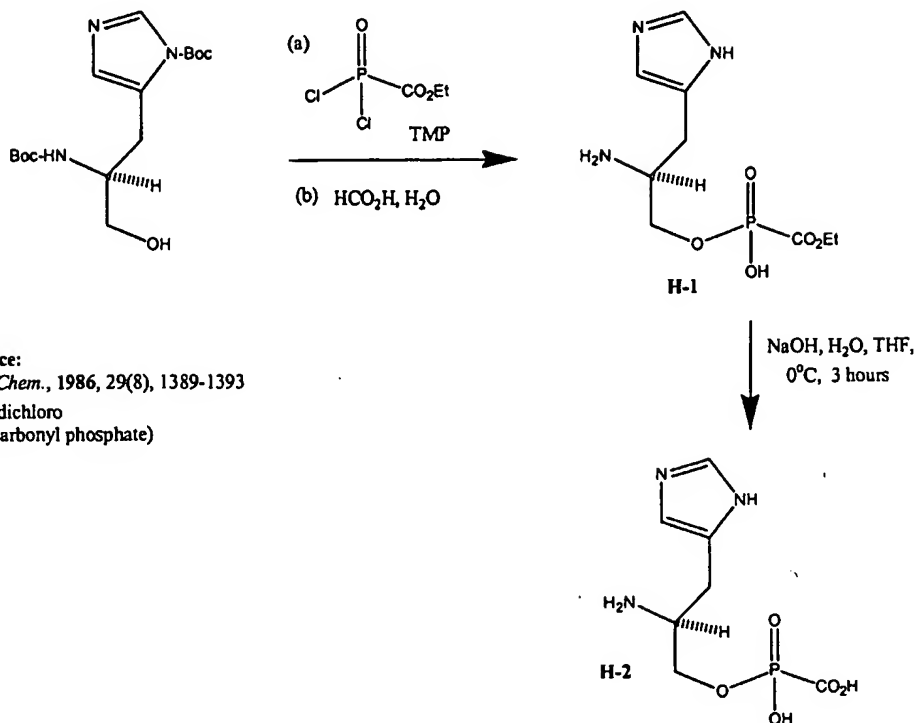
15

A toxophore can be substituted for the phosphate group in the
substrate to create an ECTA substrate. In the example above, the DNA
polymerase inhibitor phosphonoformate is used as an example of a
20 toxophore.

Synthesis of Histidinol Phosphatase iECTA Substrate

Histidinol phosphatase iECTA

5



Compound H-1

- 10 To 1 gram (5.2 mmol) of ethoxycarbonyl phosphonic dichloride (J. Med Chem., 1986, 29(8), 1389-1393) dissolved in 10 mL of trimethylphosphate, and cooled to 0°C, is added 1 gram (2.9 mmol) of dry bis-N-tBoc-histidinol. The reaction is allowed to stir for 1 hour at 0°C, and then it is poured slowly into 25 mL of anhydrous diethyl ether with stirring.
- 15 The product is separated by decantation and washed twice with 5 mL anhydrous diethyl ether. The crude product is dried under vacuum and dissolved in 5 mL of anhydrous formic acid at 0°C, allowed to warm up to room temperature and stirred for 2 hours, then heated gently at 50°C for 30 minutes. Most of the formic acid is evaporated *in vacuo* at 30°C, then water

is added, and the product evaporated to dryness under reduced pressure. The product is purified on a Dowex 2 (X8, 200-400 mesh, Cl⁻ form) column by elution with water and elution with a gradient of 0.0-0.15 M LiCl. The water is evaporated and ethanol is added. The lithium salt of product H-1 is

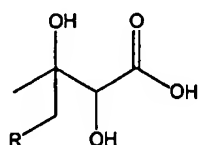
5 isolated after partial evaporation of the ethanol.

Compound H-2

Compound H-1 is treated with 1.5eq. of NaOH in aqueous THF at 0° C for 3 hours. After evaporation of the solvent under reduced pressure, the product is purified as above to furnish the lithium salt of Compound H-2.

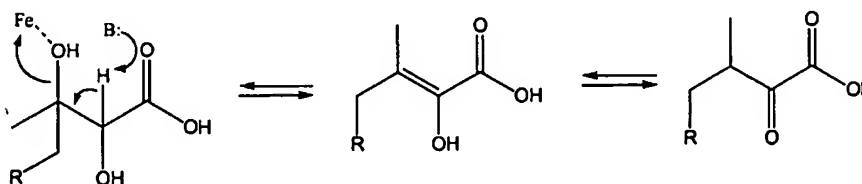
10

EC 4.2.1.9 Dihydroxyacid Dehydratase



R = H (ultimate product is Valine)

R = CH₃ (ultimate product is Isoleucine)



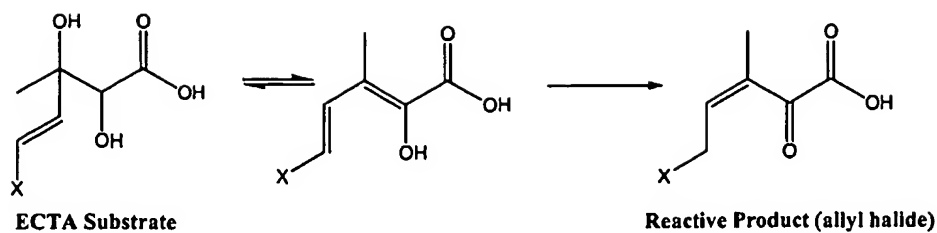
Requirement for C2 (R) configuration
not stereoselective for C3 position

15 Dihydroxyacid dehydratase (DHAD) is an enzyme found on the branched chain amino acid biosynthetic pathway. The enzyme mechanism and substrate SAR has been well characterized by substitutions at C3 (See Pirrung et al. and Armstrong et al.).

Also, DHAD has been shown to be the target for the bacteriostatic
20 effects of 4,7-dicyanobenzofurazan (See Takabatake et al.)

The DHAD ECTA substrate shown below is designed to generate a very reactive alkylating agent upon activation by the enzyme.

DHAD iECTA Substrate

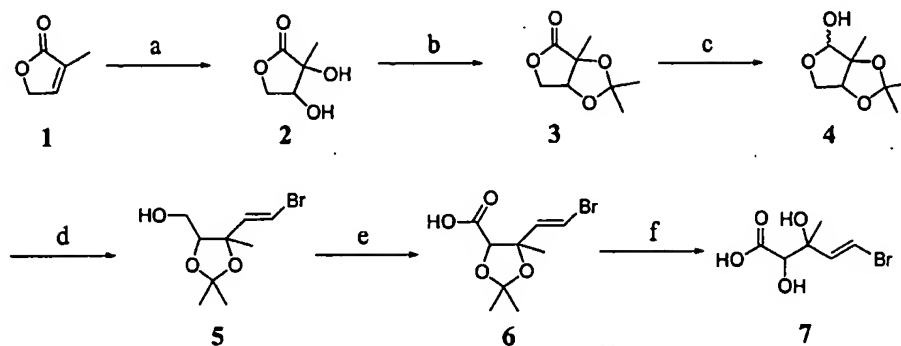


5

X = Halogen

Synthesis of DHAD iECTA Substrate

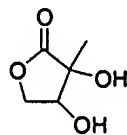
Scheme 1



10

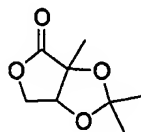
a) OsO_4 , NMO, *tert*-butanol : H_2O : THF 10 : 1 : 3; b) 2,2-dimethoxypropane, TsOH, DMF; c) DIBALH, CH_2Cl_2 , -78°C to rt; d) $\text{BrPPh}_3\text{CH}_2\text{Br}$, KO^tBu , THF, -78°C ; e) NaIO_4 , $\text{RuCl}_3 \cdot \text{H}_2\text{O}$, H_2O , CH_3CN , CCl_4 ; f) 80 % AcOH, 100°C .

15



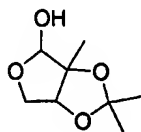
Dihydro-3, 4-dihydroxy-3-methyl-2 (3H)-furanone (2)

To a mixture of *N*-methylmorpholine-*N*-oxide (36 mmol), *tert*-butanol (400 mL), H₂O (40 mL), THF (120 mL), and OsO₄ (0.39 mmol) is added 3-methyl-2(5H)-furanone (1) (34 mmol). The reaction is stirred overnight. A slurry of 6 g of sodium hydrosulfite, 8 g of Florisil® and 27 mL of water is added to the reaction mixture. The mixture is stirred and filtered. The filtrate is neutralized to pH 7 with 1 N H₂SO₄. The THF is evaporated *in vacuo* and the remaining mixture is acidified to pH 2 with 1 N H₂SO₄. The solution is extracted with 3 × 150 mL of ethyl acetate. The organic layers are combined, dried over Na₂SO₄, and filtered. The solvent is evaporated *in vacuo*. (See VanRheenen, et al.)



2-Methyl-2, 3-*O*-isopropylidene-erythronolactone (3)

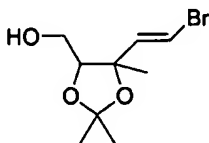
2, 2-Dimethoxypropane (84.7 mmol) and *p*-toluenesulfonic acid monohydrate (catalytic) is added to a solution of 2 (84.7 mmol) and dimethylformamide (21.2 mL). The reaction mixture is stirred overnight. The reaction is quenched with 30 mL of H₂O. The water layer is extracted with 3 × 50 mL of ethyl acetate. The combined organic layers are washed with 2 × 30 mL of water and with 5 × 30 mL of brine or until the organic layer is clear. The organic layer is dried over Na₂SO₄ and filtered. The solvent is evaporated *in vacuo*. (See Evans et al. and Lipshutz et al.)



25

2-Methyl-2, 3-*O*-isopropylidene erythrose (4)

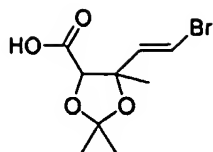
All glassware is flame dried and the reaction is performed under argon gas. A flask is charged with 3 (10.0 mmol) and CH_2Cl_2 (31.3 mL) and cooled to -78°C in an acetone-dry ice bath. A 1.0 M solution of DIBALH in THF (15.6 mmol) is added dropwise down the sides of the flask. The
5 reaction mixture is stirred at -78°C for 3 hours. The reaction mixture is warmed to room temperature overnight. The reaction mixture is cooled to 0°C in an ice bath and 5 mL of methanol is added to quench the reaction mixture. To a mixture of 1 : 1 water : ethyl acetate (150 mL each) is added to the reaction mixture. The aqueous layer is acidified to pH 3 with 5 %
10 H_2SO_4 . The phases are separated and the aqueous layer is extracted with 2×75 mL ethyl acetate. The combined organic layers are dried over Na_2SO_4 , filtered, and the solvent is evaporated *in vacuo*. (See Gypser et al. and Cohen et al.)



15

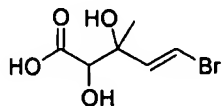
5

All glassware is flame dried and the reaction is performed under argon gas. A flask charged with (bromomethyl)triphenylphosphonium bromide (12.6 mmol) and THF (22 mL) is cooled to -78°C in an acetone-dry ice bath
20 and a 1 M solution of potassium *tert*-butoxide in THF (12.6 mmol) is added dropwise. A solution of 4 (4.2 mmol) in THF (2.2 mL) is added dropwise. The reaction mixture is stirred for 1 hour at -78°C . The cooling bath is removed and the reaction mixture is left overnight. The reaction mixture is quenched with 50 mL of water. The water layer is extracted with 3×50 mL
25 of diethyl ether. The organic layers are combined and washed with 1×100 of brine. The organic layer is dried over MgSO_4 , filtered, and the solvent is evaporated *in vacuo*. (See Gypser, et al. and Dötz, et al.)



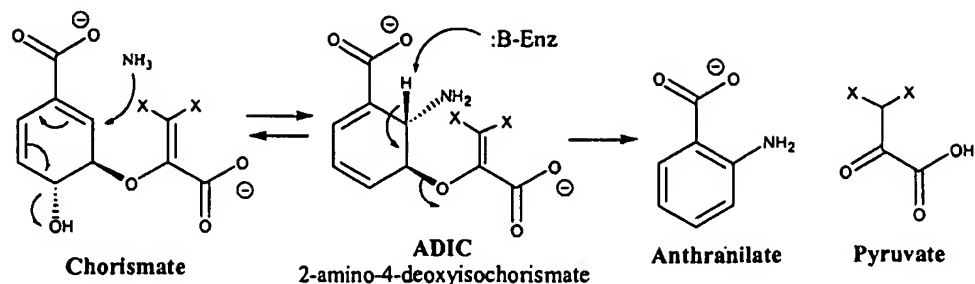
6

To a flask charged with water (3 mL), CCl₄ (2 mL), and acetonitrile (2 mL), is added NaIO₄ (4.7 mmol), ruthenium(III) chloride hydrate (2.2 mol percent), and **5** (1.1 mmol). The reaction mixture is stirred at room temperature for 1 hour. Diethyl ether (20 mL) is added to the reaction mixture which is then stirred for 10 minutes. The solution is filtered and the solids are washed with diethyl ether. The solvent is evaporated *in vacuo*.
 (See *J. Org. Chem.*)



15 7

Isopropylidene **6** (1.0 mmol) is dissolved in 80 % acetic acid (5 mL) and heated at 100° C for 1.5 hours. The reaction mixture is cooled and the solvent is evaporated *in vacuo*. (See Lewbart, et al. and Hanessian, et al.)

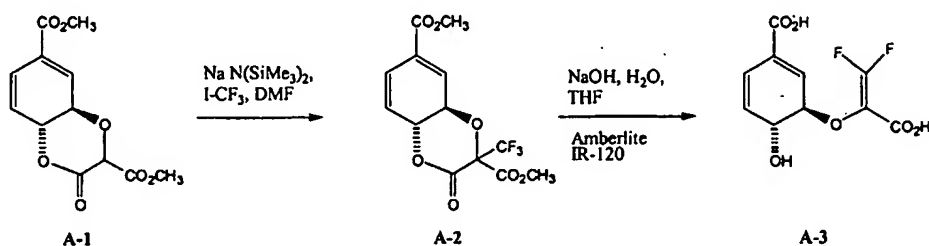
EC 4.1.3.27 Anthranilate Synthase

5

X = Hydrogen = natural substrate

X = Halogen = ECTA substrate

Chorismate is the branch point for the biosynthesis of several natural products. The reaction shown above is the first step down the tryptophan biosynthetic pathway where chorismate is converted to anthranilate and pyruvate. By substituting halogens for one or both hydrogens as shown above, a very potent alkylating agent can be produced, di- or mono-halo-pyruvate. This can be the basis for several other ECTA substrates. The synthesis of a chorismate based ECTA substrate is shown below:



Synthesis of Anthranilate Synthase ECTA Substrate
Compound A-1

Hexamethyldisilazane (0.350 g, 2.16 mmol) is added to a suspension of oil free NaH (0.048 g, 2.00 mmol) (pre-washed with petroleum ether) in 5.

mL of anhydrous DMF. When H₂ evolution ceases, a solution of lactone A-1 (See Ganem et al.) (0.536 g, 2.00 mmol) in 5 mL DMF is added. After stirring 15 minutes at room temperature, a solution of trifluoromethyl iodide (0.800 g, 4.10 mmol) in 5 mL DMF is added, and the reaction is allowed to proceed at room temperature for 3 hours. The reaction is then poured into saturated NaCl solution and extracted with ethyl acetate (2 x 25 mL). The combined organic layers are washed with saturated NaCl (2 x 25 mL), dried over anhydrous Na₂SO₄, and the solvent evaporated under reduced pressure to furnish crude A-2, which is processed as is in the next step.

10

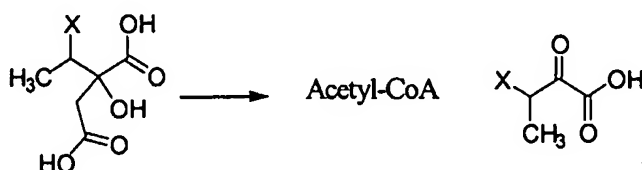
Compound A-3

The crude product from the alkylation step is dissolved in 10 mL of ice-cold THF and 2.0 equivalents of aqueous 0.01 M NaOH are added. The reaction is allowed to proceed at 0° C for 3 hours. After 3 hours, the reaction is stirred gently with Amberlite IR-120 resin (See Berchtold, et al.), filtered, and the solvent evaporated under reduced pressure. Compound A-3 is purified by recrystallization from ethyl acetate-hexane.

15

EC 4.1.3.12 Isopropylmalate Synthase

20



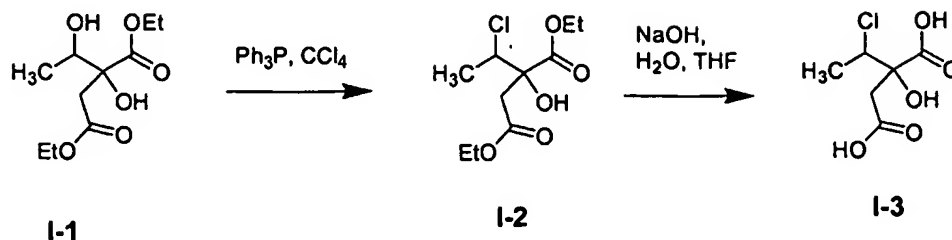
X = CH₃ = natural substrate

X = Halogen = ECTA substrate

25

The reaction shown above is on the branched chain amino acid (BCAA) biosynthetic pathway. By substituting a halogen for one of the methyl groups as shown above, a very potent alkylating agent can be produced, 3-halo-2-oxobutanoate.

Synthesis of 2-Isopropylmalate Synthase iECTA

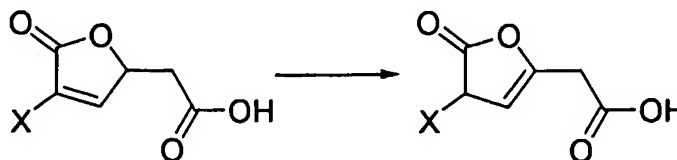


5

- To a mixture of 1 gram of dihydroxy diester I-1 (*See* Zhdanov et al.) and 2.5 grams of anhydrous triphenyl phosphine is added 20 mL of anhydrous CCl_4 , and the reaction is refluxed for 15-30 minutes (*See*
- 10 *Tetrahedron*). The solvent is then evaporated to dryness under reduced pressure. The residue is extracted twice with 25 mL of diethyl ether, and the combined fractions are evaporated under reduced pressure. The resulting crude chloroester I-2 is hydrolyzed to the corresponding dicarboxylic acid by stirring with 2.0 equivalents of aqueous NaOH in THF at 0°C for 3.5 hours.
- 15 The reaction is then acidified with dilute HCl, and the product is obtained by extraction with two 25 mL portions of ethyl acetate. The ethyl acetate fractions are combined, dried with anhydrous Na_2SO_4 , filtered and the solvent is removed under reduced pressure. The product I-3 is purified by chromatography on silica gel using EtOAc/Hexane/HOAc.

20

EC 5.3.3.4 Muconolactone Δ -Isomerase



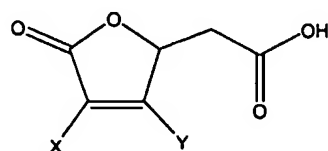
25

X = Hydrogen = natural substrate

X = Halogen = ECTA substrate

The reaction shown above is on the phenylalanine metabolism pathway. The enzyme converts a stable vinyl-halo ester into a very reactive (alkylator) allyl halide species.

5 **Muconolactone Δ -Isomerase ECTA Substrate:**



KNOWN COMPOUNDS

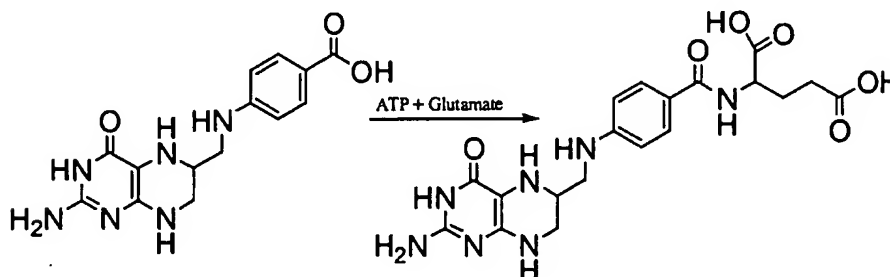
X = Cl, F; Y = H

X = Br, Cl; Y = OH, CH₃

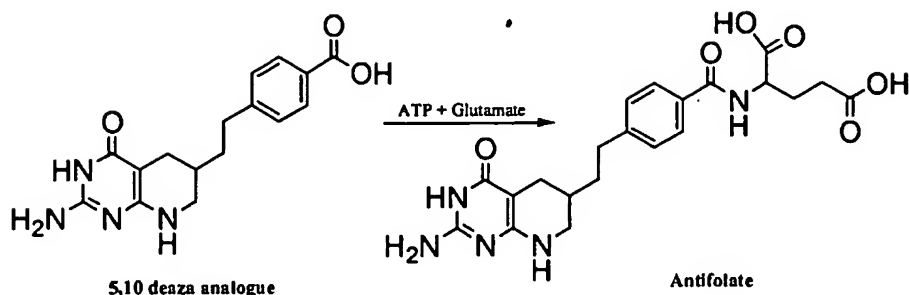
See McKague, Vollmer, et al., Freer, et al., Patrick et al., Bloomer, et al., and Syendsen, et al..

10

EC 6.3.2.12 Dihydrofolate Synthase



15 The reaction shown above is the final step in folic acid biosynthesis where a glutamate is conjugated to the dihydroptericoic acid substrate. Most microorganisms produce their own folic acid, whereas it is an essential vitamin for humans because we lack this biosynthetic pathway right up through this step. Antifolates have been used for both cancer chemotherapy
20 as well as for microbial infections, but they are only potent after glutamate conjugation (See Goodman and Gillman (1996) THE PHARMACOLOGICAL BASIS OF THERAPEUTICS, 9th edition, McGraw-Hill). We can take advantage of the above reaction for ECTA by delivering a ptericoic acid analogue of an antifolate and allowing the microbial dihydrofolate synthase to attach the first
25 glutamate. The ptericoic acid itself should not be toxic to the host.

iECTA Substrate for Dihydrofolate Synthase:

5

The 5,10-dideazapteroic acid is a known compound, and its synthesis has been published. The 5,10-dideazafolate is an experimental antifolate (*Id.*) (See also Degraw et al. and Taylor et al.).

10

Experiment # 6- Biological Confirmation for Selecting a Candidate AcLS or KARI iECTA Prodrug

Salmonella typhimurium, *Escherichia coli* or other bacteria or fungi are used as test cells. Two phenotypes are employed. One strain is normal for acetolactate synthase (AcLS) and the other is deficient. Such strains have been previously described, e.g., Shaw, et al. (1980) and Weinstock, et al. (1992) and can be obtained from the American Type Culture Collection, the *E. coli* Genetic Stock Center (Yale University), the Salmonella Genetic Stock Center (University of Calgary, Canada), and other sources. The AcLS-negative strains are generally referred to as *ilv*⁻ because they are dependent upon added isoleucine and valine for growth. The *ilv*⁻ mutant strains will be compared to the normal parent strains (*ilv*⁺) for sensitivity to candidate compounds. Strains that express the active form of AcLS will be able to transform an AcLS iECTA compound into a cytotoxic moiety. For this reason, the normal strains will be more sensitive to a successful AcLS compound than will the mutant *ilv*⁻ strains. Similar assays can also be

25

performed on mammalian cells to determine the degree of specificity for AcLS-producing bacteria or fungi.

Assays are performed on agar plates or in liquid media containing the appropriate nutrients (Miller (1972)). Inhibition of growth of ilv^+ strains is
5 measured by decreased colony formation on agar plates containing a potential AcLS activated prodrug, or decreased growth rate in liquid culture containing the candidate drug (Minimal Inhibitory Concentration, MIC.) Utility is further demonstrated by performing these assays comparing the candidate AcLS iECTA compounds with known antibiotics versus
10 pathogens. Similar growth assays can be performed to test the utility of potential compounds on yeast and other potential pathogens using methods appropriate for these eukaryotic organisms, as described by Spector, et al. (1998). Additional tests are performed to demonstrate minimal toxicity vs. normal animal or human cells. These tests are done as described by
15 Sugarman, et al. (1986). A satisfactory result will be at least 10-fold, and preferably one hundred or one thousand fold greater sensitivity of pathogen (such as bacteria or yeast) to AcLS iECTA compounds as compared to animal or human cells.

20 **Experiment # 7 - Prodrugs Designed To Target iECTA Enzymes**

Using the methods described above, the following iECTA prodrugs and enzyme prodrug systems are provided.

When the enzyme is a member of the subgroup 1.1, the compound has the structure: R-CHOH-X-Toxin, wherein X is selected from the group
25 consisting of O, S, and NH.

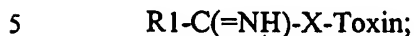
When the enzyme is a member of the subgroup EC 1.2, the prodrug is a compound of the structure: R-(C=O)-X-Toxin, wherein X is O or S.

When the enzyme is a member of the subgroup EC 1.3, the prodrug is a compound of the structure: R1R2-CH-CHR3-CH2-X-Toxin, wherein R1,
30 R2 and R3 are unspecified, and wherein X is O or S.

When the the enzyme is a member of the subgroup EC 1.4 or 1.5, then the prodrug is a compound of the structure:

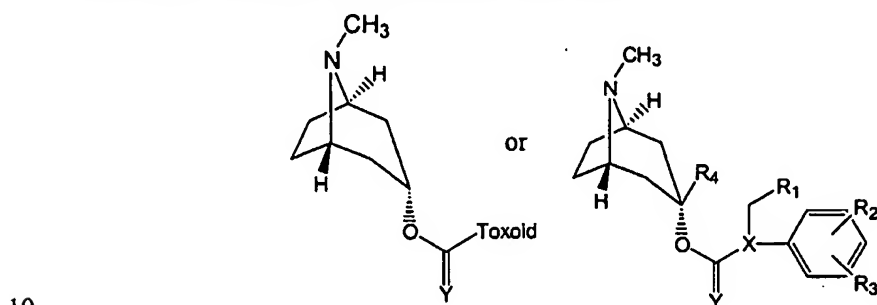


or



wherein X is selected from the group O, S and NH, with the proviso that when X is S or O, the amine (NH) is not an amide.

When the enzyme is a member of the subgroup EC 3.1.1.10, the prodrug is a compound having either structure:



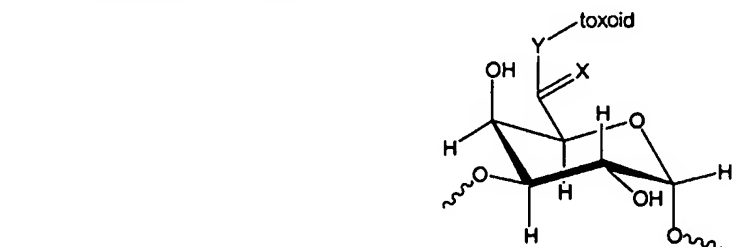
wherein Y is selected from the group consisting of O, S, Se, and NR;

wherein R is unspecified;

wherein X is selected from the group consisting of C and N; and

15 wherein each of R1, R2, R3 and R4 is independently the same or different and is a toxoid, or is unspecified. The "toxoid" is directly linked toxoid or connected through a linker (i.e., self-immolative).

When the enzyme is a member of the subgroup EC 3.1.1.11, the prodrug is a compound of the structure:

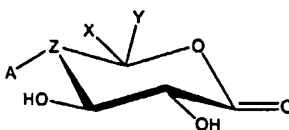


wherein X is selected from the group consisting of O, S, Se, and NR;

wherein R is unspecified; and

wherein Y is selected from the group consisting of O, S and NR,
 wherein R is unspecified. Toxoid is either toxoid or linker-toxoid.

When the enzyme is a member of the subgroup EC 3.1.1.17, the
 prodrug is a compound of the structure:



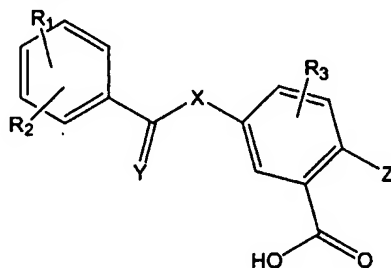
5

wherein A, X, and Y are independently the same or different and is
 selected from the group consisting of a toxoid, CH₂OH or CH₂OPO₃;

wherein Z is selected from the group consisting of CH₂, N, NR, O, S
 and Se; and

10 wherein R is unspecified.

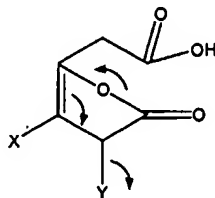
When the enzyme is a member of the subgroup EC 3.1.1.20, the
 prodrug is a compound of the structure:



15 wherein R1, R2, R3 are independently the same or different and are
 unspecified; and

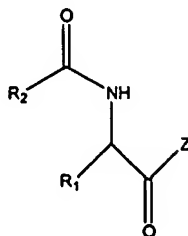
wherein Z is a linker and/or a toxoid.

When the enzyme is a member of the subgroup EC 3.1.1.24, the
 prodrug is a compound of the structure:



20 wherein X is a halide or hydrogen; and
 wherein Y is a linker-toxoid or a toxoid.

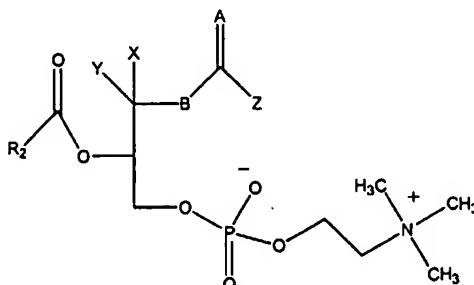
When the enzyme is a member of the subgroup EC 3.1.1.29, the prodrug is a compound of the structure:



- wherein each of R1 and R2 are independently the same or different
 5 and is selected from the group consisting of an amino acid, an amino acid side chain, a toxoid, a linker, or a peptide; and

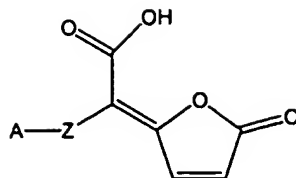
wherein Z is selected from the group consisting of a toxoid which may have RNA like structure or be RNA or a nucleic acid analog.

- When the enzyme is a member of the subgroup EC 3.1.1.32, the
 10 prodrug is a compound of the structure:



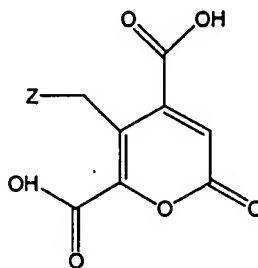
- wherein R2 is a fatty acid;
 wherein X, Y and Z are independently the same or different and is
 selected from the group consisting of a toxoid, toxoid linker, O, S, and NR,
 15 wherein R is unspecified; and
 wherein A and B are independently the same or different and is
 selected from the group consisting of O, S, and NR wherein R is unspecified.

When the enzyme is a member of the subgroup 3.1.1.45, the prodrug is a compound of the structure:



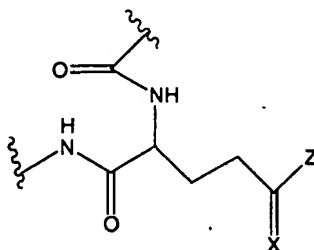
wherein A and Z are independently the same or different and is selected from the group consisting of toxoid, toxoid-linker, a halogen and a heteroatom.

- 5 When the enzyme is a member of the subgroup 3.1.1.57, the prodrug is a compound of the structure:



wherein Z is selected from the group consisting of toxoid and toxoid-linker.

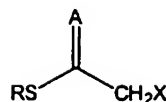
- 10 When the enzyme is a member of the subgroup 3.1.1.61, the prodrug is a compound of the structure:



wherein Z is selected from the group consisting of toxoid and toxoid-linker; and

- 15 wherein X is selected from the group consisting of O, S, and NR, wherein R is unspecified.

When the enzyme is a member of the subgroup 3.1.2.1, the prodrug is a compound of the structure:



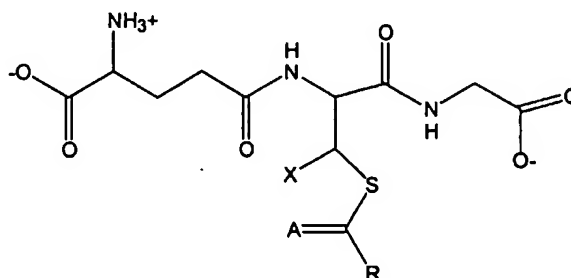
wherein RS is Coenzyme A ("CoAS") or a variable thiol including smaller analogs of CoAS;

wherein A is selected from the group consisting of O, S, and NR,

5 wherein R is unspecified; and

wherein X is Cl, Br, I and F.

When the enzyme is a member of the subgroup 3.1.2.12, the prodrug is a compound of the structure:



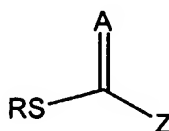
10 wherein X is H or a toxoid;

wherein A is selected from the group consisting of O, S, and NR; and

wherein R is selected from the group consisting of H, a halomethyl and a toxoid.

When the enzyme is a member of the subgroup 3.1.2.14, the prodrug

15 is a compound of the structure:

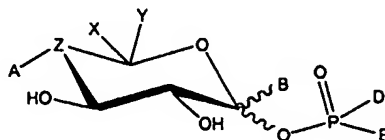


wherein R is selected from the group consisting a simple or complex thiol and ACP or acyl carrier protein;

wherein A is O, S, and NR, wherein R is unspecified; and

20 wherein Z is selected from the group consisting of a toxoid, a toxoid-linker, and a fatty acid analog having antibacterial/antifungal/antimicrobial properties.

When the enzyme is a member of the subgroup 3.1.3.10, the prodrug is a compound of the structure:

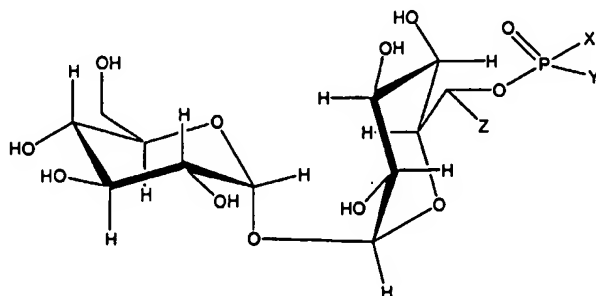


wherein A, B, X and Y are independently the same or different and
 5 each is selected from the group consisting of toxoid, CH₂OH, CH₂OPO₃ and H;

wherein Z is selected from the group consisting of CH₂, N, O, S, SE or NR, wherein R is unspecified; and

wherein D and E are independently the same or different and is
 10 selected from the group consisting of OH, NHCH₂CH₂Cl and SCH₂CH₂Cl.

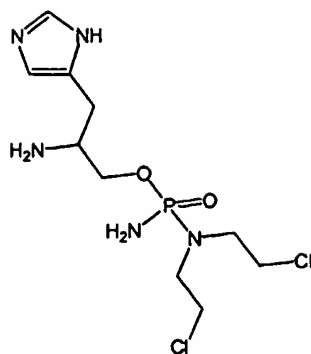
When the enzyme is a member of the subgroup 3.1.3.12, the prodrug is a compound of the structure:



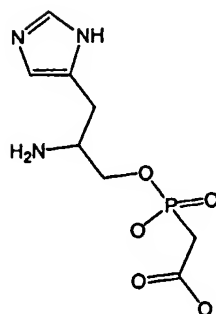
wherein Z is selected from the group consisting of a toxoid, H and a
 15 toxoid-linker; and

wherein X and Y are independently the same or different and is selected from the group consisting of OH, NHCH₂CH₂Cl and SCH₂CH₂Cl.

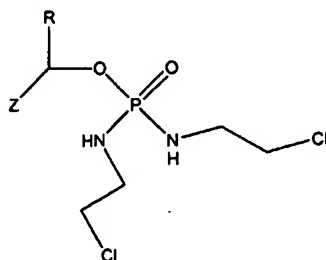
When the enzyme is a member of the subgroup 3.1.3.15, the prodrug is a compound of the structure:



OR

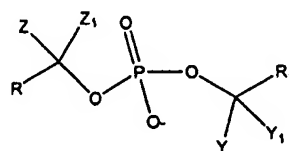


When the enzyme is a member of the subgroup 3.1.3.X, wherein X is
 5 18 or 27, the prodrug is a compound of the structure:



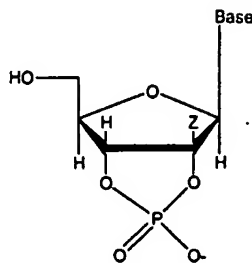
wherein Z is selected from the group consisting of H, a toxoid and
 toxoid-linker.

When the enzyme is a member of the subgroup 3.1.4.14, the prodrug
 10 is a compound of the structure:



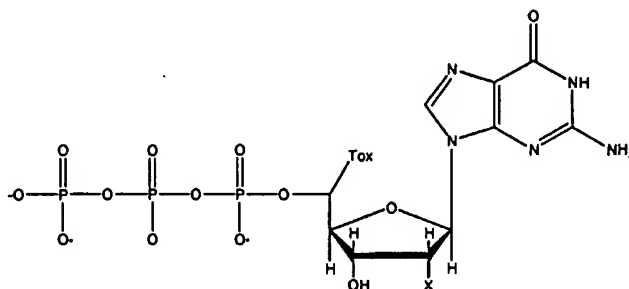
wherein Y, Y1, Z and Z1 is a toxoid.

When the enzyme is of the subgroup 3.1.4.16, the prodrug is a compound having the structure:



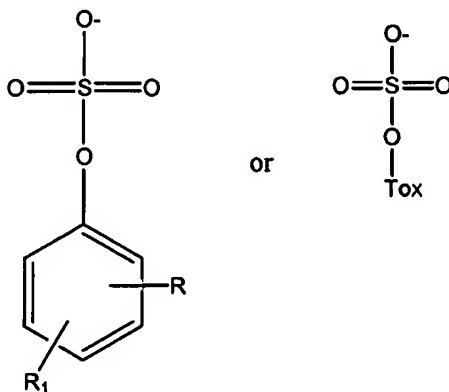
- wherein the base is selected from the group consisting of adenine,
 5 tyrosine, guanine, cytosine and uracil; and
 wherein Z is a toxoid.

When the enzyme is of the subgroup 3.1.5.1, the prodrug is a compound having the structure:



- 10 wherein X is H or OH; and
 wherein Tox is a toxoid.

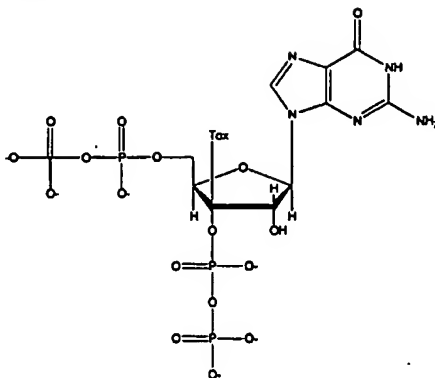
When the enzyme is of the subgroup 3.1.6.1, the prodrug is a compound having the structure:



- 15 wherein R and R1 is a toxoid or linker-toxoid; and

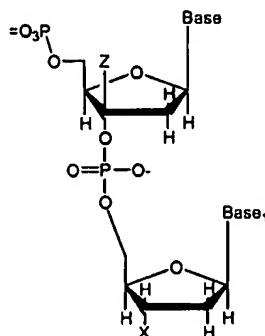
wherein Tox is a toxoid.

When the enzyme is of the subgroup 3.1.7.2, the prodrug is a compound having the structure:



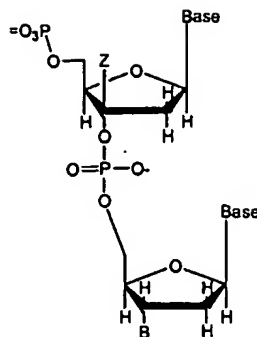
5 wherein Tox is a toxoid.

When the enzyme is of the subgroup 3.1.11.1, the prodrug is a compound having the structure:



wherein the base is selected from the group consisting of adenine,
 10 tyrosine, guanine, cytosine and uracil;
 wherein Base 1 is a toxoid;
 wherein Z is selected from the group consisting of toxoid and toxoid-linker; and
 wherein X is OH or a phosphate.

15 When the enzyme is of the subgroup 3.1.11.5, the prodrug is a compound having the structure:

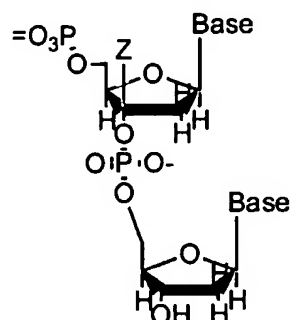


wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;

wherein B is a phosphate or a DNA small oligonucleotide; and

5 wherein Z is a toxoid or a toxoid-linker.

When the enzyme is of the subgroup 3.1.11.6, the prodrug is a compound having the structure:

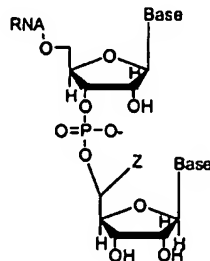


wherein Base is selected from the group consisting of adenine,

10 tyrosine, guanine, cytosine and uracil; and

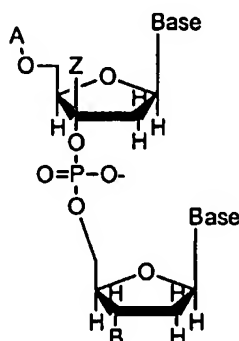
wherein Z is a toxoid or a toxoid-linker.

When the enzyme is of the subgroup 3.1.13.1, the prodrug is a compound having the structure:



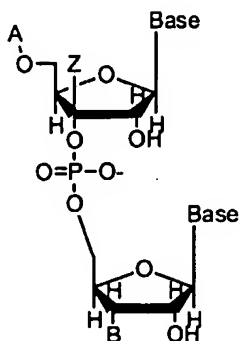
wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil; and
 wherein Z is a toxoid or a toxoid-linker.

- When the enzyme is of the subgroup 3.1.21.x, wherein x is selected
 5 from the group consisting of 2, 3, 4, and 5, then the prodrug is a compound having the structure:



- wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;
 10 wherein A and B are independently the same or different and are selected from the group consisting of a phosphate and a deoxyribonucleic acid small oligonucleotide; and
 wherein Z is a toxoid or a toxoid-linker.

- When the enzyme is of the subgroup 3.1.26.x, wherein x is selected
 15 from the group consisting of 3, 4, and 5, then the prodrug is a compound having the structure:

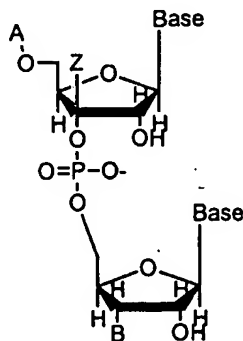


wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;

wherein A and B are independently the same or different and are selected from the group consisting of a phosphate and a deoxyribonucleic acid small oligonucleotide; and

wherein Z is a toxoid or a toxoid-linker.

- 5 When the enzyme is selected from the subgroup 3.1.26.X, wherein X is selected from the group consisting of 3, 5, and 6, the prodrug is a compound having the structure:

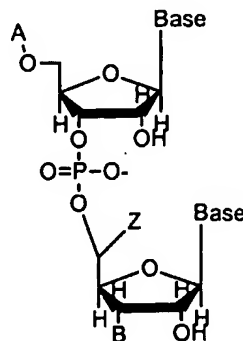


- wherein the base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;

wherein A and B are independently the same or different and is a phosphate or a ribonucleic acid small oligonucleotide; and

wherein Z is a toxoid or toxoid-linker.

- When the enzyme is of the subgroup 3.1.27.6, the prodrug is a compound having the structure:

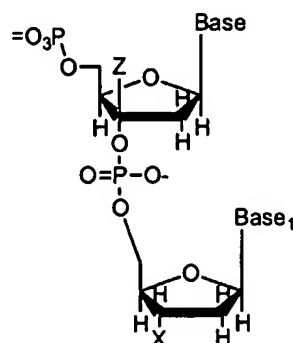


wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;

wherein A and B are independently the same or different and are selected from the group consisting of a phosphate and a ribonucleic acid oligonucleotide; and

wherein Z is a toxoid or a toxoid-linker.

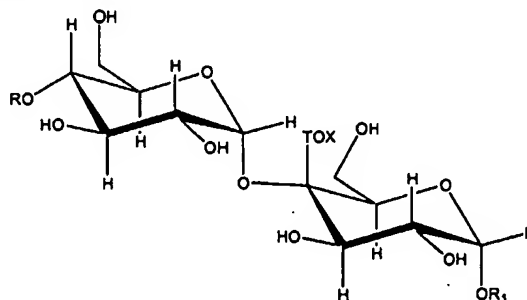
- 5 When the enzyme is of the subgroup 3.1.31.1, the prodrug is a compound having the structure:



wherein Base is selected from the group consisting of adenine, tyrosine, guanine, cytosine and uracil;

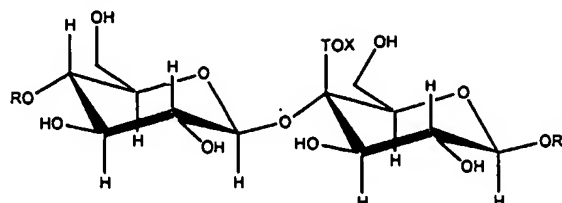
- 10 wherein Base1 is a toxoid;
 wherein X is OH or a phosphate;
 wherein Y is H or OH; and
 wherein Z is a toxoid or a toxoid-linker.

- When the enzyme is of the subgroup 3.2.1.3, the prodrug is a
 15 compound having the structure:



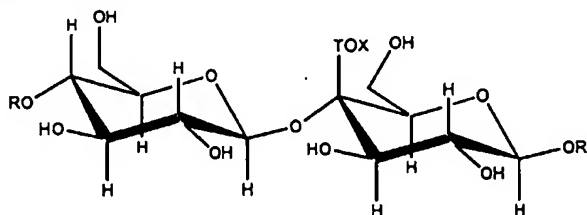
wherein R is H and R1 is a glucose polymer of the formula (glucose)_n,
 wherein n is an integer from 1 to ____; and
 wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.4, the prodrug is a compound having the structure:



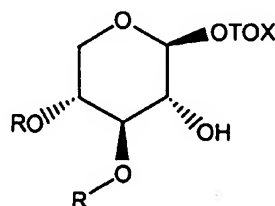
- 5 wherein R and R1 are the same or different and is repeating beta-(1,4)-glucose in cellulose; and
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.73, the prodrug is a compound having the structure:



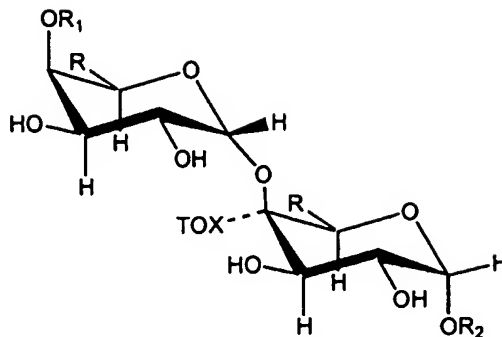
- 10 wherein R and R1 are the same or different and are repeating beta-D-glucans containing 1-3 or 1-4 linkages; and
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.8, the prodrug is a compound having the structure:



- 15 wherein R is H or an oligosaccharide; and
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.15, the prodrug is a compound having the structure:

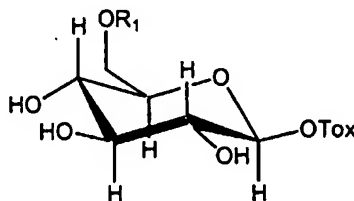


wherein R is CO_2H ;

wherein R1 and R2 is polygalacturonic acids linked alpha 1-4; and

wherein TOX is a toxoid.

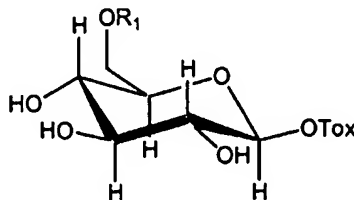
- 5 When the enzyme is of the subgroup 3.2.1.21, the prodrug is a compound having the structure:



wherein R1 is H or beta-glucosidase; and

wherein TOX is a toxoid.

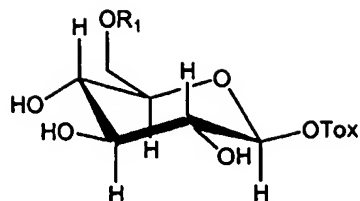
- 10 When the enzyme is of the subgroup 3.2.1.86, the prodrug is a compound having the structure:



wherein R1 is phosphate or 6-phospho-beta-glucosidase; and

wherein TOX is a toxoid.

- 15 When the enzyme is of the subgroup 3.2.1.91, the prodrug is a compound having the structure:

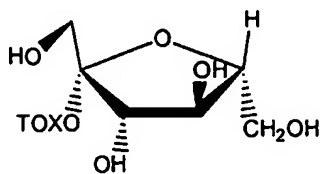


wherein R₁ is unspecified; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.26, the prodrug is a

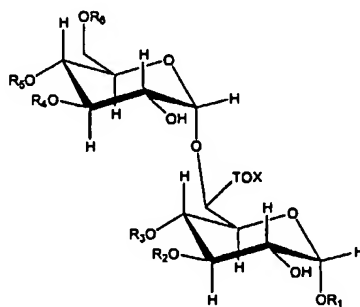
5 compound having the structure:



wherein TOX is a toxoid or a glucose derivative.

When the enzyme is of the subgroup 3.2.1.33, the prodrug is a

compound having the structure:

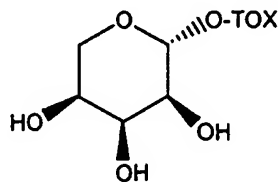


10

wherein each of R₁, R₂, R₃, R₄, R₅ and R₆ are independently the same or different and is selected from the group consisting of H or a saccharide; and

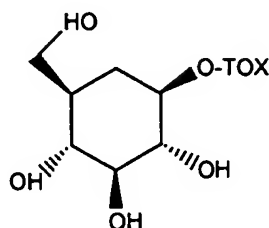
wherein TOX is a toxoid.

15 When the enzyme is of the subgroup 3.2.1.55, the prodrug is a compound having the structure:



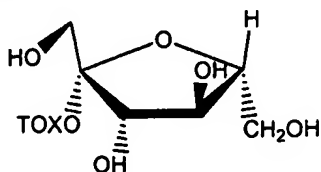
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.58, the prodrug is a compound having the structure:



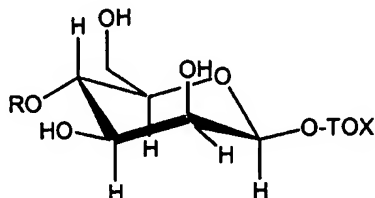
5 wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.65, the prodrug is a compound having the structure:



wherein TOX is a toxoid.

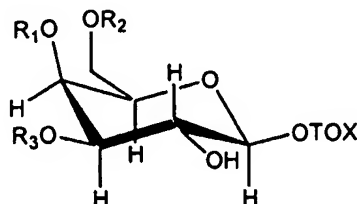
10 When the enzyme is of the subgroup 3.2.1.78, the prodrug is a compound having the structure:



wherein R is unspecified; and

wherein TOX is a toxoid.

15 When the enzyme is of the subgroup 3.2.1.85, the prodrug is a compound having the structure:



wherein R1 is H;

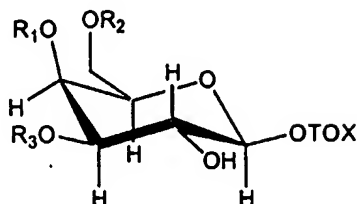
wherein R₂ is PO₃;

wherein R₃ is H; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.81, the prodrug is a

5 compound having the structure:

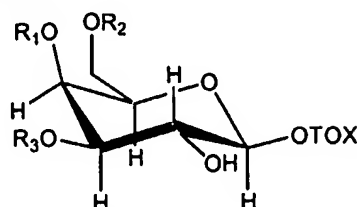


wherein R₁ is agarose;

wherein R₂ and R₃ are each H; and

wherein TOX is a toxoid.

10 When the enzyme is of the subgroup 3.2.1.83, the prodrug is a compound having the structure:



wherein R₃ is a carrageen polymer;

wherein R₁ is SO₃⁻;

15 wherein R₂ is OH; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.89, the prodrug is a

compound having the structure:

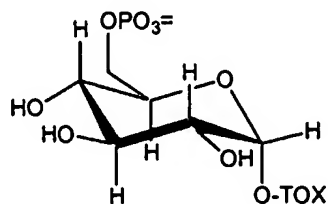


20 wherein R₁ is an arabinogalactan polymer;

wherein R2 and R3 are independently the same or different and is a H or an arabinogalactan polymer; and

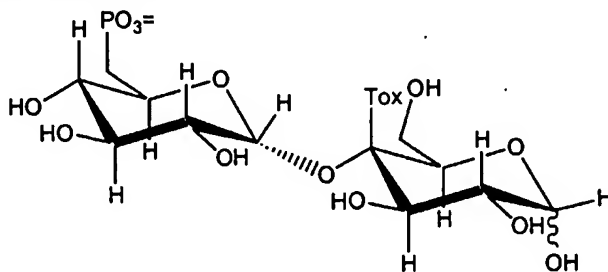
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.93, the prodrug is a
5 compound having the structure:



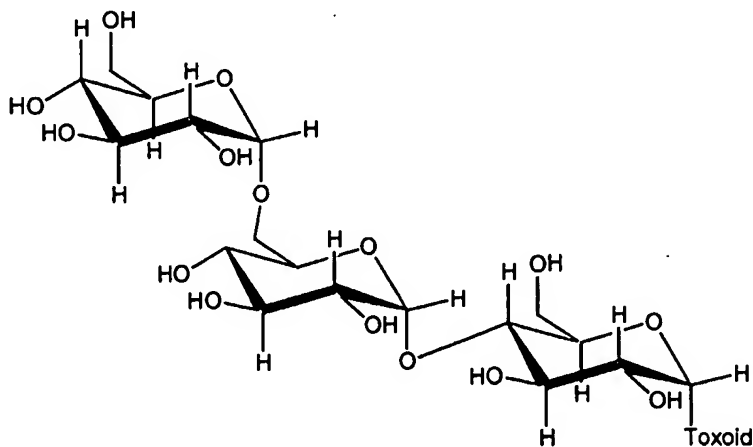
wherein TOX is a toxoid that may alternatively have a saccharide structure.

When the enzyme is of the subgroup 3.2.1.122, the prodrug is a
10 compound having the structure:



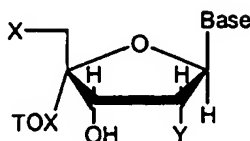
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.1.135, the prodrug is a
compound having the structure:



wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.1, the prodrug is a compound having the structure:

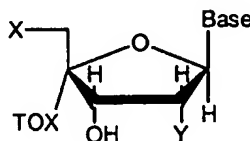


5 wherein Base is a purine;

wherein X and Y are independently the same or different and is OH or a purine nucleosidase; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.16, the prodrug is a
10 compound having the structure:



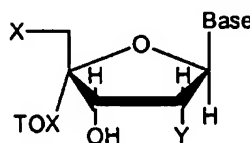
wherein Base is adenine;

wherein X is CH_3S ;

wherein Y is OH or a methylthioadenosine nucleosidase; and

15 wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.20, the prodrug is a compound having the structure:



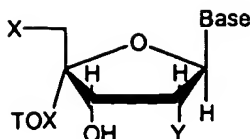
wherein Base is a 3-methylated adenine;

20 wherein X is deoxyribonucleic acid;

wherein Y is H or DNA-3-methyladenine glycosidase I; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.23, the prodrug is a compound having the structure:



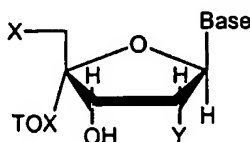
wherein Base is ring-opened N7-methylguanine;

wherein X is deoxyribonucleic acid;

wherein Y is H or formamidopyrimidine-DNA glycosidase; and

5 wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.4, the prodrug is a compound having the structure:



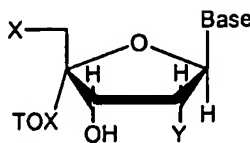
wherein Base is adenine;

10 wherein X is OPO^3 ;

wherein Y is OH or AMP nucleosidase; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.2.2.9, the prodrug is a compound having the structure:



15

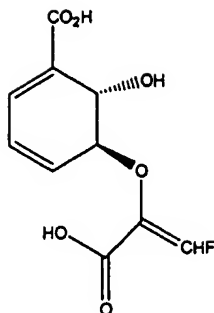
wherein Base is adenine;

wherein X is S-homocysteine;

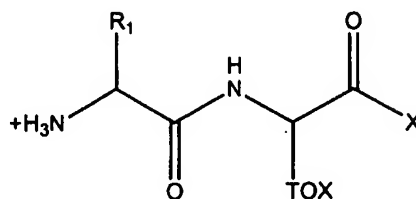
wherein Y is OH or S-adenosylhomocysteine nucleosidase; and

wherein TOX is a toxoid.

20 When the enzyme is of the subgroup 3.3.2.1, the prodrug is a compound having the structure:



When the enzyme is of the subgroup 3.4.11.10, the prodrug is a compound having the structure:



5

wherein R1 is a leucyl side chain;

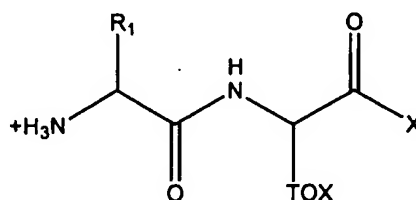
wherein R2 is any amino acid;

wherein X is an oligopeptide or a leucyl aminopeptidase; and

wherein TOX is a toxoid.

10

When the enzyme is of the subgroup 3.4.11.5, the prodrug is a compound having the structure:



wherein R1 is a proline side chain;

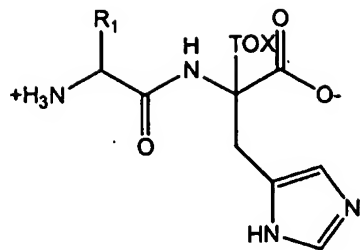
wherein R₂ is any amino acid;

wherein X is an oligopeptide or a proline iminopeptidase; and

wherein TOX is a toxoid.

15

When the enzyme is of the subgroup 3.4.13.3, the prodrug is a compound having the structure:

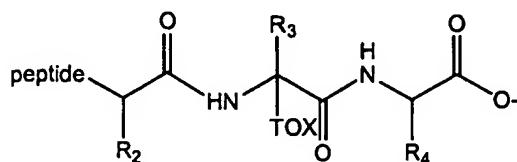


wherein R1 is unspecified; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.15.5, the prodrug is a

5 compound having the structure:

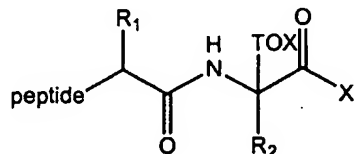


wherein R2, R3 and R4 are unspecified; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.16.4, the prodrug is a

10 compound having the structure:

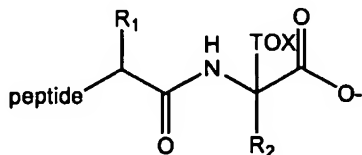


wherein R1 and R2 is a D-Ala amino acid side chain; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.17.11, the prodrug is a

15 compound having the structure:



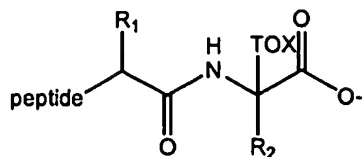
wherein R1 is unspecified;

wherein R2 is a glutamate side chain or glutamate carboxypeptidase;

and

20 wherein TOX is a toxoid.

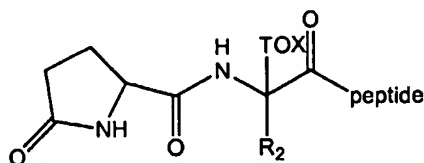
When the enzyme is of the subgroup 3.4.17.19, the prodrug is a compound having the structure:



wherein R1 and R2 are unspecified; and

5 wherein TOX is a toxoid.

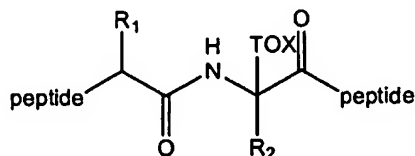
When the enzyme is of the subgroup 3.4.19.3, the prodrug is a compound having the structure:



wherein R2 is unspecified; and

10 wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.21.50, the prodrug is a compound having the structure:

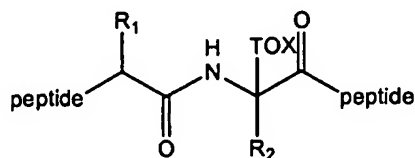


wherein R1 is a lysyl side chain;

15 wherein R2 is unspecified, and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.21.53, the prodrug is a compound having the structure:

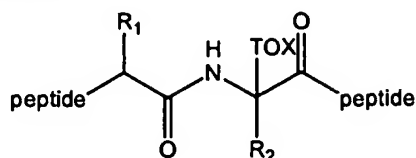


20 wherein R1 is unspecified or endopeptidase LA

wherein R2 is unspecified; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.21.72, the prodrug is a compound having the structure:

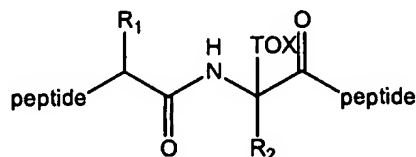


5 wherein R1 is pro in immunoglobulin A or IgA-specific serine endopeptidase;

wherein R2 is unspecified; and

wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.4.21.88, the prodrug is a
10 compound having the structure:

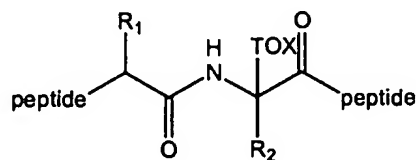


wherein R1 is Ala84 in reprecursor lex A or repressor lexA peptidase;

wherein R2 is unspecified; and

wherein TOX is a toxoid.

15 When the enzyme is of the subgroup 3.4.21.89, the prodrug is a compound having the structure:

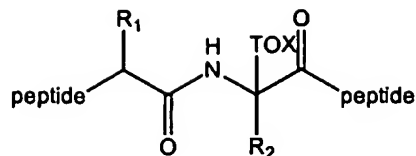


wherein R1 is an N-terminal leader sequence in a signal peptide or
signal peptidase I;

20 wherein R2 is unspecified; and

wherein TOX is a toxoid.

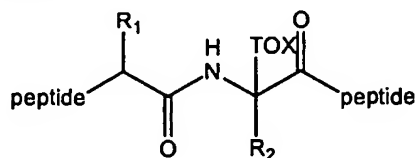
When the enzyme is of the subgroup 3.4.23.23, and the prodrug is a compound having the structure:



wherein R1 and R2 are independently the same or different and is a hydrophobic side chain or mucorpepsin; and

wherein TOX is a toxoid.

- 5 When the enzyme is of the subgroup 3.4.23.36, the prodrug is a compound having the structure:

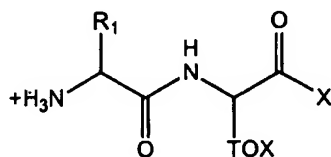


wherein R1 is unspecified;

wherein R2 is a cysteinyl side chain or signal peptidase II; and

- 10 wherein TOX is a toxoid.

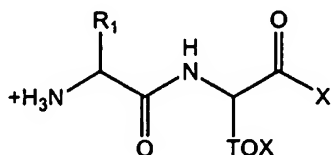
When the enzyme is of the subgroup 3.4.24.X, wherein X is selected from the group consisting of 25, 26, 28, and 36, the prodrug is a compound having the structure:



- 15 wherein R1 is unspecified; and

wherein TOX is a toxoid.

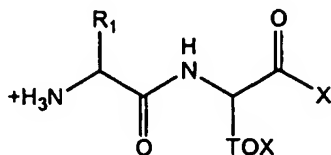
When the enzyme is of the subgroup 3.4.24.55, the prodrug is a compound having the structure:



- 20 wherein R1 is tyrosine or phenylalanine; and

wherein TOX is a toxoid.

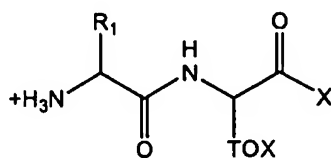
When the enzyme is of the subgroup 3.4.24.57, the prodrug is a compound having the structure:



wherein R1 is arginine; and

5 wherein TOX is a toxoid.

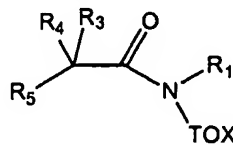
When the enzyme is of the subgroup 3.4.24.70, the prodrug is a compound having the structure:



wherein R1 is glycine or alanine; and

10 wherein TOX is a toxoid.

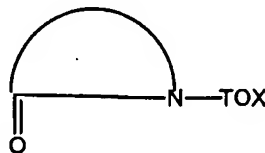
When the enzyme is of the subgroup 3.5.1.X, wherein X is selected from the group consisting of 1, 10, 11, 16, 18, 19, 24, 25, 31, 32, 38, 14, 46, 15, 54, 6, 68, 78, and 81, the prodrug is a compound having the structure:



15 wherein R1, R3, R4 and R5 are unspecified; and

wherein TOX is a toxoid.

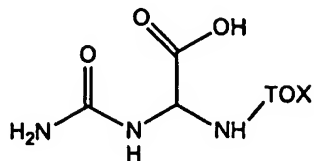
When the enzyme is of the subgroup 3.5.2.X, wherein X is selected from the group consisting of 5, 6, 7, and 10, the prodrug is a compound having the structure:



20

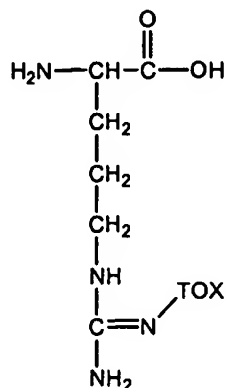
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.5.3.4, the prodrug is a compound having the structure:



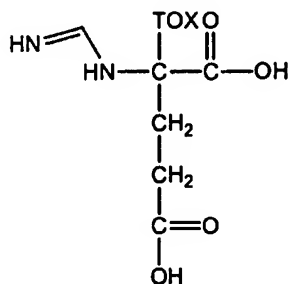
wherein TOX is a toxoid.

- 5 When the enzyme is of the subgroup 3.5.3.6, the prodrug is a compound having the structure:



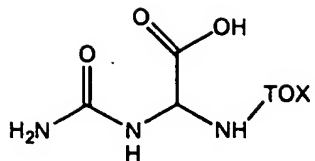
wherein TOX is a toxoid.

- 10 When the enzyme is of the subgroup 3.5.3.8, the prodrug is a compound having the structure:



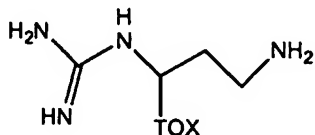
wherein TOX is a toxoid.

When the enzyme is of the subgroup 3.5.3.9, the prodrug is a compound having the structure:



wherein TOX is a toxoid.

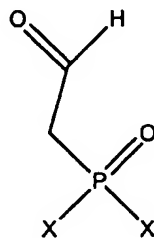
When the enzyme is of the subgroup 3.5.3.11, the prodrug is a compound having the structure:



5

wherein TOX is a toxoid.

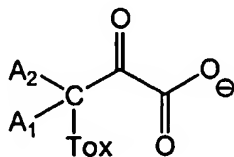
When the enzyme is of the subgroup 3.11.1.1, the prodrug is a compound having the structure:



10

wherein X is NHCH₂CH₂Cl.

When the enzyme is of the subgroup 4.1.1.1, the prodrug is a compound having the structure:

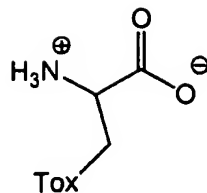


15

unspecified; and

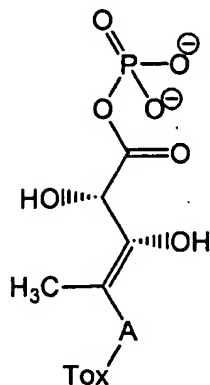
wherein TOX is a toxoid.

When the enzyme is of the subgroup 4.1.1.18, the prodrug is a compound having the structure:



wherein TOX is a toxoid.

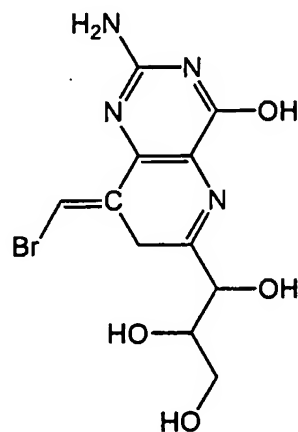
When the enzyme is of the subgroup 4.1.2.19, the prodrug is a compound having the structure:



5

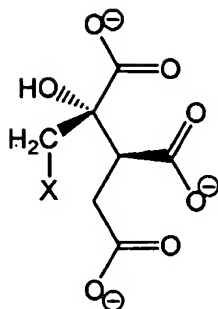
wherein TOX is a toxoid.

When the enzyme is of the subgroup 4.1.2.25, the prodrug is a compound having the structure:



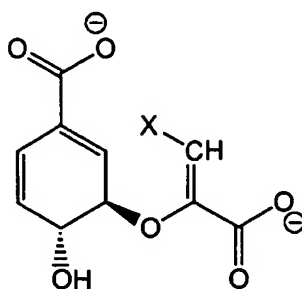
10

When the enzyme is of the subgroup 4.1.3.30, the prodrug is a compound having the structure:



wherein X is selected from the group consisting of Cl, Br, I and F.

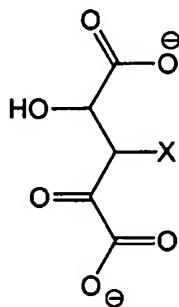
When the enzyme is of the subgroup 4.1.3.27, the prodrug is a compound having the structure:



5

wherein X is selected from the group consisting of Cl, Br, I and F.

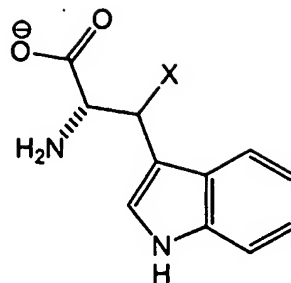
When the enzyme is of the subgroup 4.1.3.16, the prodrug is a compound having the structure:



10

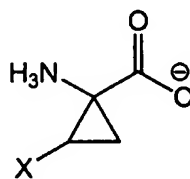
wherein X is selected from the group consisting of Cl, Br, I and F.

When the enzyme is of the subgroup 4.1.99.1, the prodrug is a compound having the structure:



wherein X is selected from the group consisting of Cl, Br, I and F.

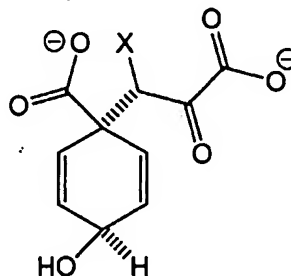
When the enzyme is of the subgroup 4.1.99.4, the prodrug is a compound having the structure:



5

wherein X is selected from the group consisting of Cl, Br, I and F.

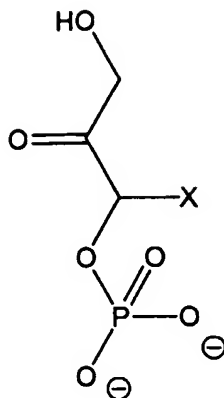
When the enzyme is of the subgroup 4.2.1.51, the prodrug is a compound having the structure:



10

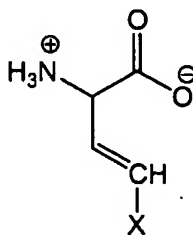
wherein X is selected from the group consisting of Cl, Br, I and F.

When the enzyme is of the subgroup 4.2.99.11, the prodrug is a compound having the structure:



wherein X is selected from the group consisting of Cl, Br, F or I.

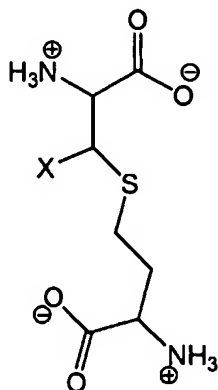
When the enzyme is of the subgroup 4.2.99.2, the prodrug is a compound having the structure:



5

wherein X is selected from the group consisting of Cl, Br, F or I.

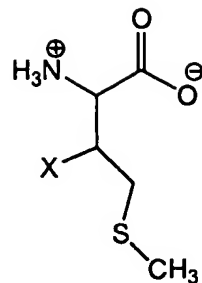
When the enzyme is of the subgroup 4.4.1.8, the prodrug is a compound having the structure:



10

wherein X is selected from the group consisting of Cl, Br, F or I.

When the enzyme is of the subgroup 4.4.1.11, the prodrug is a compound having the structure:



wherein X is selected from the group consisting of Cl, Br, F, and I.

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to one skilled in the art that
5 various changes and modifications can be made therein without departing from the spirit and scope thereof.

References

- Amyes, S.G. et al. (1992) *J Med Microbiol.* **36**(1):1-3
- Armstrong et al. (1985) *J. Chem. Soc., Perkin Trans.* **1**:691
- Armstrong, D. et al. (1999) *INFECTIOUS DISEASES* (edited by Mosby)
- 5 Arthur M., et al. (1999) *Antimicrob Agents Chemother.* **43**(8):1875-80
- Aulabaugh, A. et al. (1990) *Biochemistry* **29**(11):2824-30
- Banerjee, D. et al. (1995) *Acta Biochem Pol.* **42**(4):457-64
- Behrens, C.H. et al. *J. Org. Chem.* (1985) **50**:5696
- Berchtold, G.A. et al. (1982) *J. Am. Chem. Soc.* **104**:1153-1154; 7036-7041
- 10 Berger-Bachi, B. et al. (1989) *Mol. Gen. Genet.* **219**(1-2):263-9
- Bertino, J.R. et al. (1996) *Stem Cells* **14**(1):5-9
- Blight, K.J. et al. (1998) *Antivir. Ther.* **3**(Suppl 3):71-81
- Bloomer, J.L. et al. (1976) *J. Chem. Soc., Perkin Trans. 1*, **14**:1485-1491
- Bohacek, R.S. et al. (1997) *Curr. Opin. Chem. Biol.* **1**(2):157-61
- 15 Bonomo, R.A. et al. (1999) *Front Biosci.* **4**:34-41
- Carlson, et al. *J. Org. Chem.* (1981) **46**:3936
- Casado et al. (2000) *AIDS.* **14**(2):F1-7
- Casadewell, B et al. (1999) *J Bacteri.* **181**(12):3644-8
- Caceres, N.E. et al. (1997) *J. Bacteriol.* **179**(16):5046-55
- 20 Chang, A.K. et al. (1998) *Biochem. J.* **333** (Pt 3):765-77
- Chipman, D. et al. (1998) *Biochem. Biophys. Acta.* **1385**(2):401-19
- Coen, D.M. *Nucleosides and Foscarnet-Mechanisms in ANTIVIRAL DRUG RESISTANCE*
- Cohen, N. et al. (1983) *J. Am. Chem. Soc.* **105**:3661-3672
- 25 Das, B. et al. (2000) *Cancer Invest.* **18**(2):115-22
- DeGraw, J.I. et al. (1986) *J. Heterocycl. Chem* **23**:1-4
- Taylor, E.C. et al. (1985) *J. Med. Chem.*, **28**:914-921
- Dötz, K.H. et al. (1999) *Organomet. Chem.* **578**:223-228
- Ekins, S. et al. (1999) *Pharmacogenetics* **9**(4):477-89
- 30 Ekins, S. et al. (1999) *J. Pharmacol. Exp. Ther.* **291**(1):424-33
- Evans, M. E. et al. (1967) *Carbohydr. Res.* **3**:453

- Freer, A.A. et al. (1996) *J. Chem. Soc., Perkin Trans. 1*, 17:2111-2116
- Ganem, B. et al. (1982) *J. Am. Chem. Soc.* **104**:6787-6788
- Gypser, A. et al. (1994) *Liebigs. Ann. Chem.*, 775-780
- Gysper, A. et al. (1997) *J. Chem. Soc., Perkin Trans. 1*, 1013-1016
- 5 Halgand, F. et al. (1999) *Biochemistry* **38**(19):6025-34
- Hanaki, H. et al. (1998) *Antimicrob Chemother.* **42**(2):199-209
- Hanessian, S. et al. (1983) *Can. J. Chem.* **61**:634
- Harms, C.T. et al. (1992) *Mol Gen. Genet.* **1**(3):427-35
- Heath, R.J. et al. (2000) *J. Biol. Chem.* **275**(7):4654-9
- 10 Hill, C.M. et al. (1997) *Biochem J.* **327** (Pt 3):891-8
- Ibdah, M. et al. (1996) *Biochemistry* **35**(50):16282-91
- Jackman A.L. et al. (1997) *Clin. Cancer. Res.* **3**(6):911-21
- Josefsson, E. et al. (1999) *J. Periodontal Res.* **34**(7):387-92
- Kirkpatrick, D.L. et al. (1999) *Comb. Chem. High Throughput Screen*
- 15 **2**(4):211-21
- Kobayashi, H. et al. (1995) *Jpn. J. Cancer Res.* **86**(11):1014-8
- Kleanthous, C. et al. (1985) *Biochemistry* **24**(20):5307-13
- Lessard I.A. et al. (1999) *Biochemistry* **38**(42):14006-22
- Lewbart, M.L. et al. (1969) *J. Org. Chem.* **34**:3505
- 20 Lipshutz, B. H. et al. (1988) *J. Org. Chem.* **53**:4495.
- Lonn, U. et al. (1996) *Cancer* **77**(1):107-12
- Louie, A. et al. (1999) *Antimicrob. Agents Chemother.* **43**(12):2841-7
- Malik, A.H. et al. (2000) *Ann. Intern. Med.* **132**(9):723-31
- Markowitz, M. et al. (1996) *Antiviral Drug Resistance*, Richman D.D. ed.
- 25 John Wiley and Sons, LTD
- McKague, A.B. (1999) *Synth. Commun.*, **29**(9):1463-1475
- McVie J.G. (1999) *Cancer Treat. Rev.* **25**(6):323-31
- Mdluli, K. et al. (1998) *Mol. Microbiol.* **27**(6):1223-33
- Murray, B. (1997) *Adv. Intern. Med.* **42**: 339-67
- 30 Miesel, L. et al. (1998) *Novartis Found. Symp.* **217**:209-20;discussion 220-1
- Montravers, P. et al. (1999) *Infect. Immun.* **67**(4):1579-84

- Mulligan, K. et al. (2000) *J. Acquir. Immune Defic. Syndr.* **23**(1):35-43
- Nelson, D.L. et al. *Principles of Biochemistry*. 2000, ed. Lehninger,
- Neu, H.C. (1992) *Science* **257**:1064-1073
- Oram, R.J. et al. (2000) *J. Infect. Dis.* **181**(4):1458-61
- 5 Pang, S.S. et al. (1999) *Biochemistry* **38**(16):5222-31
- Papamichael, D. (1999) *Oncologist* **4**(6):478-87
- Patrick, T.B. et al. (1994) *J. Org. Chem.* **59**(5):1210-1212
- Pirrung et al. (1991) *J. Am. Chem. Soc.* **111**: 1020
- Poulsen, C. et al. (1989) *Eur. J. Biochem.* **185**(2):433-9
- 10 Ruas, M. et al. (1998) *Biochem. Biophys. Acta.* **378**(2):F115-77
- Raynaud, C. et al. (1999) *Microbiology* **145**(Pt 6):1359-67
- Sambrook et al., "*Molecular Cloning: A Laboratory Manual*", 2nd Edition.
- Sausville, E.A. et al. (1999) *Pharmacol Ther.* **82**(2-3):285-92
- Schaechter, M. (1993) *Mechanisms of Microbial Disease* ed. Williams &
- 15 Wilkins
- Schmit, I. et al. (1999) *J. Infect. Dis.* **180**(2):487-90
- Schmitz, F.J. et al. (1999) *In Infectious Diseases*, ed. D. Armstrong and J. Cohen
- Shaner, D.L. et al. *Biochemistry and Molecular Biology* Roe, R.M. et al.,
- 20 (Eds.) IOS Press, 1997
- Shaw, K.J. et al. (1980) *J. Bacteriol.* **141**(3):1258-63
- Shaw, W.V. et al. (1988) *Biochem Soc Trans.* **16**(6):939-42
- Shaw, W.V. et al. (1991) *Annu. Rev. Biophys. Biophys. Chem.* **20**:363-86
- Shirasaka, T. et al. (1995) *Proc Natl Acad Sci U S A.* **92**(6):2398-402
- 25 Simon, S.M. et al. (1994) *Proc. Natl. Acad. Sci. U S A.* **91**(9):3497-504
- Smith, K.A. et al. (1995) *Philos. Trans. R. Soc. Lond B. Biol. Sci.* **347**(1319):49-56
- Spector D.L. et al. (1998) *Culture and Biochemical Analysis of Cells. A Laboratory Manual*, Cold Spring Harbor Laboratory Press
- 30 Staschke et al. (1995) *Virology* **214**(2):642-6
- Stühlinger, M. et al. (1994) *J. Steroid Biochem. Mol. Biol.* **49**(1):39-42

- Sugarman, B.J. et al. (1985) *Science* **230**:943-945
- Svendsen, A. et al. (1975) *J. Org. Chem.* **40**(13):1927-1932
- Takabatake, T. et al. (June 1992) *Chem. Pharm. Bull.* **40**(6):1644-6
- Tamburrini, E. et al. (1999) *Med. Microbiol Immunol. (Berl)*. **188**(1):1-7
- 5 *Tetrahedron* (1967) **23**:359
- Totsuka, K. et al. (1999) *Antimicrob. Chemother.* **44**(4):455-60
- VanRheenen, V. et al. (1976) *Tetrahedron Lett.* **23**:1973-1976
- Varghese, J.N. et al. (1998) *Structure* **6**(6):735-46
- Venturi, G. et al. (2000) *J. Infect. Dis.* **181**(2):740-5
- 10 Voet, D. et al. (1995) *Biochemistry* John Wiley & Sons, Inc.
- Vollmer, M.D. et al. (1994) *J. Bacteriol.* **176**(14):4366-4375
- Vollmer, M.D. et al. (1995) *J. Bacteriol.* **177**(10):2938-2941
- Vollmer, M.D. et al. (1998) *Appl. Environ. Microbiol.* **64**(9), 3290-3299
- Wakselman, C. et al. (1982) *Journal of Fluorine Chemistry* **21**(82):99-106
- 15 Weinstock, O. et al. (1992) *J Bacteriol.* **174**(17):5560-6
- Wettergren, Y. et al. (1994) *Somat Cell Mol Genet.* **20**(4):267-85
- Whitcomb, C.E. (1999) *Toxicol Ind Health.* **15**(1-2):231-9
- Yuan, Y. et al. (1995) *Proc Natl Acad Sci U S A* **92**(14):6630-4
- Yen, Y. et al. (1994) *Cancer Res.* **54**(14):3686-91
- 20 Zhdanov, Y.A. et al. (1971) *Zh. Obshch. Khim* **41**(8):1844-1848
- Zimbelman, J. et al. (1999) *Pediatr. Infect. Dis. J.* **18**(12):1096-100

CLAIMS

1. A method for inhibiting the proliferation of a pathogen or a cell infected with an pathogen, wherein the pathogen expresses an iECTA enzyme, comprising contacting the pathogen or the cell with an effective amount of an iECTA prodrug that is activated to a toxin by the pathogen or in the cell by the iECTA enzyme, thereby inhibiting the proliferation of the pathogen or the cell.
2. The method of claim 1, wherein the iECTA enzyme is selected from the group of enzymes listed in Figures 7A and B and their biological equivalents.
3. The method of claim 2, wherein the iECTA enzymes beta-lactamase and peptide deformylase are specifically excluded.
4. The method of claim 1, wherein the iECTA enzyme is a member selected from the group consisting of the enzymes designated EC1, EC2, EC3, EC4, EC5, and EC6.
5. The method of claim 1, wherein the pathogen is selected from the group consisting of bacteria, parasites, rickettesia, virus, and fungus.
6. The method of claim 1, wherein the contacting is *in vitro* or *in vivo*.
7. A method for screening for a therapeutic agent that selectively inhibits the growth of pathogen or a pathogen-infected cell, comprising contacting the pathogen or the cell with an effective amount of an iECTA prodrug that is activated to a toxin by the pathogen or in the cell by the iECTA enzyme and assaying for inhibition growth of the pathogen or the cell.
8. The method of claim 7, wherein the iECTA enzyme is selected from the group of enzymes listed in Figures 7A and 7B, and their biological equivalents.

9. The method of claim 7, wherein the enzyme is a member of an enzyme selected from the group consisting of the enzymes designated EC1, EC2, EC3, EC4, EC5, and EC6.
10. The method of claim 7, wherein the iECTA enzymes beta-lactamase and peptide deformylase are specifically excluded.
11. The method of claim 7, wherein the enzyme is a member of the group consisting of the enzymes designated EC1, EC2, EC3, EC4, EC5, and EC6.
12. The method of claim 7, wherein the pathogen is selected from the group consisting of bacteria, parasites, rickettsia, virus, and fungus.
13. The method of claim 7, wherein the contacting is *in vitro* or *in vivo*.
14. The method of claim 7, further comprising delivering to a normal, non-infected counterpart cell to the infected host cell, an effective amount of the iECTA prodrug and assaying the normal, non-infected cell for inhibition of cell growth or cytotoxicity.
15. The method of claim 7, wherein the host cell is infected with a pathogen that expresses or induces the expression of an enzyme that is selectively expressed by the pathogen.
16. The method of claim 14, wherein the normal, non-infected counterpart is a plant cell or an animal cell.
17. The method of claim 16, wherein the animal cell is a mammalian cell.
18. A method for identifying drug targets, comprising:
- searching a first data structure to obtain a first set of information, wherein the first set of information comprises first enzymes associated with a target organism or in a pathogen-infected cell;

- 5 b. searching one or more data structures to obtain one or more sets of information, wherein the one or more sets of information comprises one or more expressed enzymes associated with one or more respective classes of organisms that is different than the target organism; and
- 10 c. comparing the first set of information to the one or more sets of information to create a first output, wherein the first output comprises target enzymes in the first set of information that are not present in the one or more sets of information, and wherein the target enzymes are drug targets.
19. The method of claim 18, wherein the enzymes are expressed by the target organism or in a pathogen infected cell, but absent in the classes of organism of step b.
- 15 20. The method of claim 18, wherein the target organism is selected from the group consisting of bacteria, parasites, rickettsia, virus, and fungus.
21. The method of claim 18, wherein the organism of step b is an animal or plant.
22. The method of claim 18, wherein the animal is a mammal.
- 20 23. The method of claim 18, wherein the comparison step utilizes an alignment search algorithm.
24. The method of claim 18, wherein the alignment search algorithm is a Needleman-Wunsch global alignment algorithm, a Smith-Waterman local alignment algorithm, a "FAST" algorithm, or a BLAST
- 25 algorithm.
25. The method of claim 18, further comprising the step of outputting a list of the target enzymes.

26. The method of claim 18, further comprising the step of comparing the first output to a data structure of metabolic enzymes, wherein the metabolic data structure contains enzymes present in metabolic pathways, to obtain a set of metabolic target enzymes, wherein the
5 metabolic target enzymes are enzymes present in both the first output and in the metabolic data structure, and a set of non-metabolic target enzymes, wherein the non-metabolic target enzymes are enzymes present in the first output but not in the metabolic data structure.
27. The method of claim 26, further comprising the step of displaying the
10 metabolic enzymes and the non-metabolic enzymes in a manner such that the metabolic enzymes are distinguishable from the non-metabolic enzymes.
28. The method of claim 18, wherein the searching steps utilize a network.
29. The method of claim 18, wherein the network is capable of searching
15 the one or more data structures, wherein the one or more data structures are stored on a plurality of servers connected to the network.
30. The method of claim 18, wherein the comparing step utilizes a user's computer.
- 20 31. The method of claim 18, wherein the first set of information comprises information about Enzyme Commission numbers relating to the first set of enzymes associated with the target organism.
32. The method of claim 18, wherein the one or more data structures
25 comprise information about Enzyme Commission numbers relating to the one or more expressed enzymes.
33. The method of claim 18, wherein the one or more data structures comprises a public domain database.

34. The method of claim 18, further comprising the additional step of using target enzymes to design iECTA compounds.

35. A method for identifying drug targets, the method comprising:

- 5 a. searching the first data structure to obtain the first set of information, wherein the first set of information comprises first enzymes associated with a target organism;
- b. searching a second data structure to obtain a second set of information, wherein the second set of information comprises second enzymes associated with a first class of organism;
- 10 c. comparing the first set of information to the second set of information to create the first output, wherein the first output comprises enzymes in the first set of information that are not present in the second set of information, and wherein the identified enzymes are drug targets;
- 15 d. searching a third data structure to obtain a third set of information relating to third expressed enzymes associated with a second class of organism, wherein the second class of organism is different from the first class of organism, wherein the third expressed enzymes are expressed at elevated levels in
20 the second class of organism; and
- e. comparing the first output with the third set of information to create a second output, wherein the second output identifies enzymes in the first output that are not present in the third set of information, and wherein the target enzymes are drug
25 targets.

36. The method of claim 35, further comprising repeating steps (d)-(e) n times, wherein there are n data structures.

37. The method of claim 35, wherein the drug targets are Enzyme Catalyzed Therapeutic Activation ("ECTA") targets.
38. The method of claim 35, wherein the comparison step utilizes an alignment search algorithm.
- 5 39. The method of claim 38, wherein the alignment search algorithm is a Needleman-Wunsch global alignment algorithm, a Smith-Waterman local alignment algorithm, a "FAST" algorithm, or a BLAST algorithm.
- 10 40. The method of claim 35, further comprising the step of outputting a list of the target enzymes.
41. The method of claim 35, further comprising the step of comparing the target enzymes to a data structure of metabolic enzymes, wherein the metabolic data structure contains enzymes present in metabolic pathways, to obtain a set of metabolic target enzymes, wherein the
15 metabolic target enzymes are both target enzymes and present in the metabolic data structure, and a set of non-metabolic target enzymes, wherein the non-metabolic target enzymes are target enzymes but are not in the metabolic data structure.
- 20 42. The method of claim 41, further comprising the step of displaying the metabolic enzymes and the non-metabolic enzymes in a manner such that the metabolic enzymes are distinguishable from the non-metabolic enzymes.
43. The method of claim 35, wherein the searching steps utilize a network.
- 25 44. The method of claim 35, wherein the network is capable of searching the n data structures, wherein the n data structures are stored on a one or more servers connected to the network.

45. The method of claim 35, wherein the comparing steps utilize a user's computer.
46. The method of claim 35, wherein the first set of information comprises information about Enzyme Commission numbers relating to the first enzymes associated with the target organism.
47. The method of claim 35, wherein any of the n data structures in the group comprises information about Enzyme Commission numbers.
48. The method of claim 35, wherein any of the n data structures comprise a public domain database.
49. The method of claim 35, wherein the class of organism is an animal or a plant.
50. The method of claim 49, wherein the animal is a mammal.
51. The method of claim 35, further comprising the step of using the target enzymes to design ECTA compounds.
52. A system for identifying enzymes for designing Enzyme Catalyzed Therapeutic Activation (ECTA) compounds, comprising:
- a. searching a first data structure to obtain a first set of information, wherein the first set of information comprises first enzymes associated with a target organism;
 - b. searching one or more data structures to obtain one or more sets of information, wherein the one or more sets of information comprises one or logic for searching a first data structure to obtain a first set of information relating to one or more enzymes associated with a target organism;
 - c. logic for searching one or more other data structures to obtain one or more additional sets of information relating to one or

more expressed enzymes associated with one or more additional classes of organisms; and

- 5 d. logic for comparing the first set of information to the one or more additional sets of information to identify enzymes in the first set of information that are not present in the one or more additional sets of information, wherein the identified enzymes are capable of being used to design ECTA compounds.

53. The system of claim 52, further comprising logic for outputting a list of the identified enzymes.

- 10 54. The system of claim 52, further comprising: logic for organizing the identified enzymes into a first set of enzymes capable of being placed into metabolic pathways and a second set of enzymes not capable of being placed into metabolic pathways; and logic for displaying the first and second sets of enzymes such that the first set of enzymes are
15 distinguishable from the second set of enzymes.

55. The system of claim 52, wherein a third data structure is queried to organize the identified enzymes.

56. The system of claim 52, wherein a network is utilized to search at least one of the first data structure and the second data structure.

- 20 57. The system of claim 56, wherein the network is capable of communicating utilizing TCP/IP or IPX protocols.

58. The system of claim 52, wherein the information relating to the one or more enzymes of the target organism includes information about Enzyme Commission (EC) numbers of the one or more enzymes.

- 25 59. The system of claim 52, wherein the one or more additional sets of information relating to the one or more expressed enzymes associated with one or more classes of organisms includes information about

Enzyme Commission (EC) numbers of the one or more expressed enzymes.

- 5 60. A computer program product for identifying enzymes for designing Enzyme Catalyzed Therapeutic Activation (ECTA) compounds, comprising:
- a. computer code for searching a first data structure to obtain a first set of information relating to one or more enzymes associated with a target organism;
 - 10 b. computer code for searching one or more other data structures to obtain one or more additional sets of information relating to one or more expressed enzymes associated with one or more additional classes of organisms; and
 - 15 c. computer code for comparing the first set of information to the one or more additional sets of information to identify enzymes in the first set of information that are not present in the one or more additional sets of information, wherein the identified enzymes are capable of being used to design ECTA compounds.
- 20 61. The computer program product of claim 60, further comprising computer code for outputting a list of the identified enzymes.
- 25 62. The computer program product of claim 60, further comprising: computer code for organizing the identified enzymes into a first set of enzymes capable of being placed into metabolic pathways and a second set of enzymes not capable of being placed into metabolic pathways; and computer code for displaying the first and second sets

of enzymes such that the first set of enzymes are distinguishable from the second set of enzymes.

63. The computer program product of claim 60, wherein a third data structure is queried to organize the identified enzymes.
- 5 64. The computer program product of claim 60, wherein a network is utilized to search at least one of the first data structure and the second data structure.
65. The computer program product of claim 64, wherein the network is capable of communicating utilizing TCP/IP or IPX protocols.
- 10 66. The computer program product of claim 60, wherein the information relating to the one or more enzymes of the target organism includes information about Enzyme Commission (EC) numbers of the one or more enzymes.
- 15 67. The computer program product of claim 60, wherein the one or more additional sets of information relating to the one or more expressed enzymes associated with one or more classes of organisms includes information about Enzyme Commission (EC) numbers of the one or more expressed enzymes.
- 20 68. A method for alleviating the symptoms of a disease related to an organism or host cell expressing an iECTA enzyme in a subject comprising administering to the subject an effective amount of an iECTA prodrug that is activated to a toxin in the organism or cell by the iECTA enzyme, thereby alleviating the symptoms.
- 25 69. The method of claim 68, wherein the iECTA enzyme is selected from the group of enzymes listed in Figures 7A and B and their biological equivalents.

70. The method of claim 69, wherein the iECTA enzymes beta-lactamase and peptide deformylase are specifically excluded.
71. The method of claim 69, wherein the iECTA enzyme is a member of an enzyme selected from the group consisting of the enzymes designated EC1, EC2, EC3, EC4, EC5, and EC6.
72. The method of claim 69, wherein the organism is selected from the group consisting of bacteria, parasites, rickettesia, virus, and fungus.
73. The method of claim 69, wherein the host is an animal or plant.
74. The method of claim 73, wherein the animal is a mammal.
75. A method for treating an infection caused by a pathogen expressing an iECTA enzyme or a host cell expressing an iECTA enzyme in a subject, comprising administering to the subject an effective amount of an iECTA prodrug that is activated to a toxin in the pathogen or cell by the iECTA enzyme, thereby alleviating the symptoms.
76. The method of claim 75, wherein the iECTA enzyme is selected from the group of enzymes listed in Figures 7A and B and their biological equivalents.
77. The method of claim 75, wherein the iECTA enzymes beta-lactamase and peptide deformylase are specifically excluded.
78. The method of claim 75, wherein the iECTA enzyme is a member of an enzyme selected from the group consisting of the enzymes designated EC1, EC2, EC3, EC4, EC5, and EC6.
79. The method of claim 75, wherein the organism is selected from the group consisting of bacteria, parasites, rickettesia, virus, and fungus.
80. The method of claim 75, wherein the host is an animal or plant.

81. The method of claim 80, wherein the animal is a mammal.

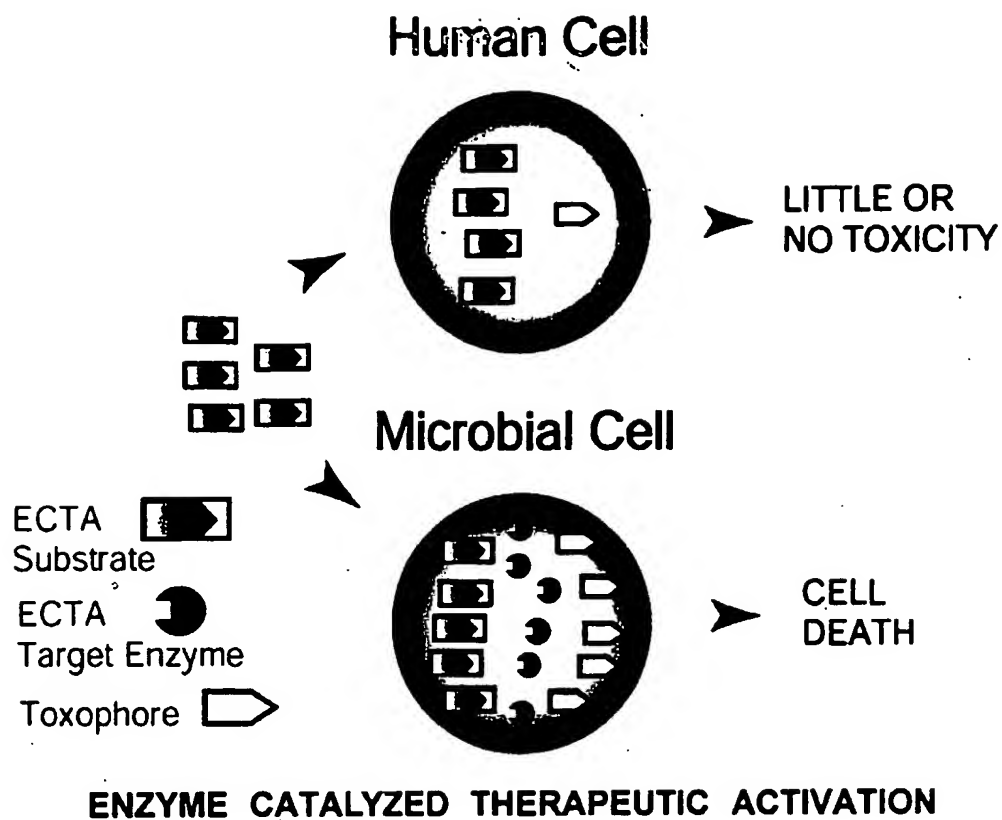


Figure 1. ECTA technology utilizes preferentially expressed enzymes in pathogenic organisms to generate cytotoxins.

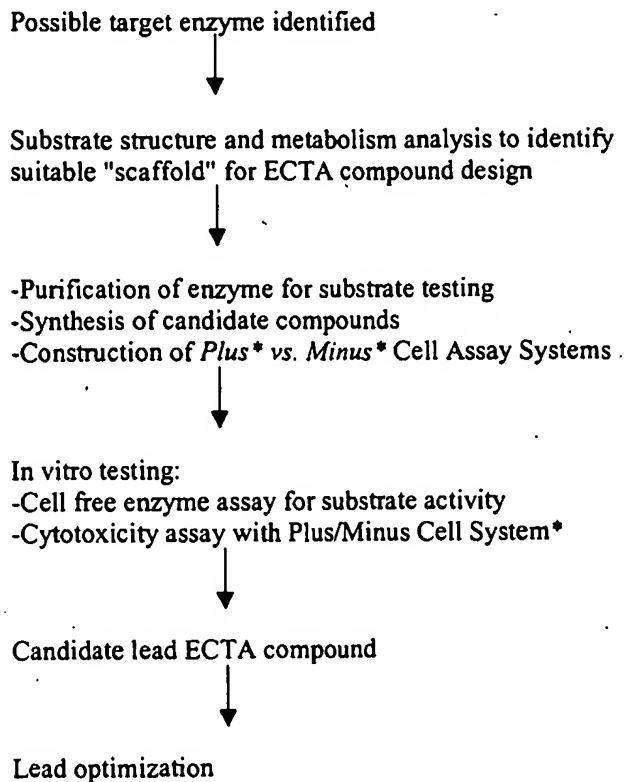
Figure 2A. ECTA Enzyme Identification**Cancer**

- Plays role in disease aggressiveness.
- Overexpressed sufficiently to provide useful therapeutic index
- Must have non-overlapping substrate specificity, ie., probably not a member of an enzyme family. (Examples of preferred targets in cancer are given in Table 2A)

Infectious Disease

- Plays role in pathogen survival or pathogenicity.
- Expression restricted to pathogen or pathogen infected cells.
- Enzyme substrate specificity distinct from enzymes expressed by host.

Figure 2B. Flow Chart for Identification of Potential ECTA Substrates. The process outlined below is representative of how target enzymes are chosen.



*Plus Cells: Selectively express or overexpress target enzyme

*Minus Cells: Are relatively deficient in target enzyme expression

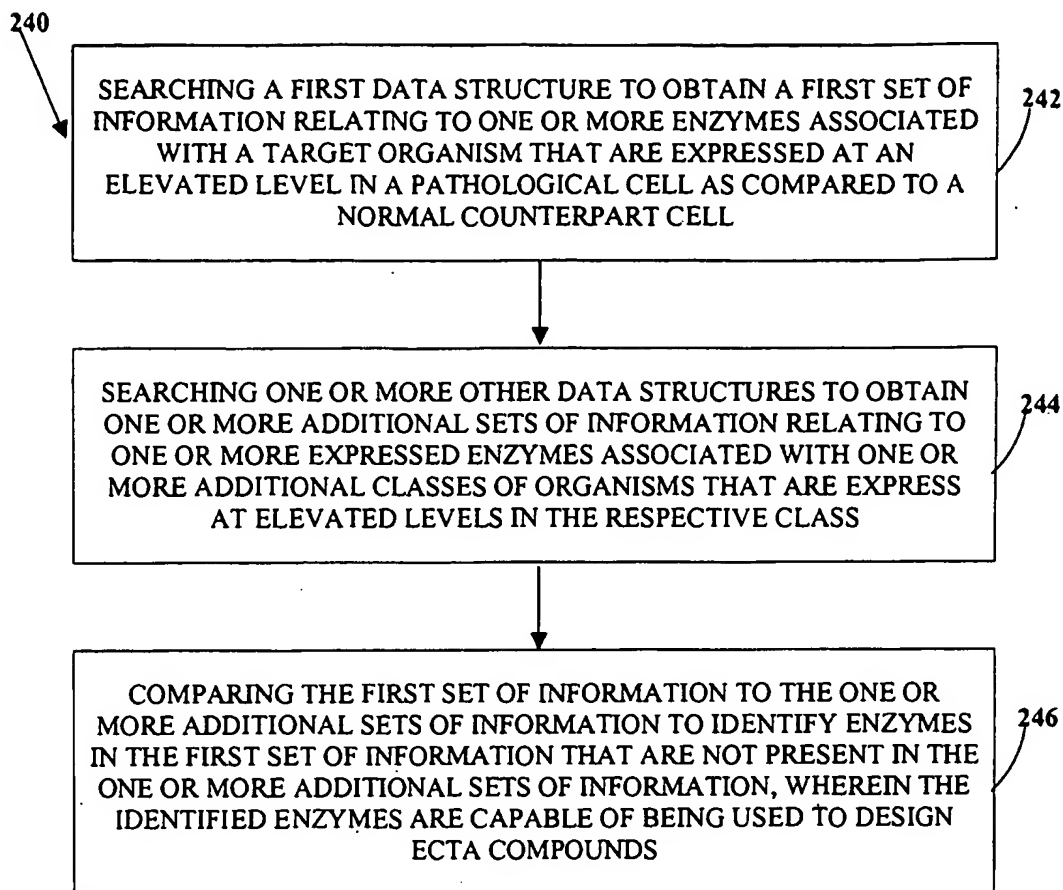
*Figure 2C*

Figure 2D

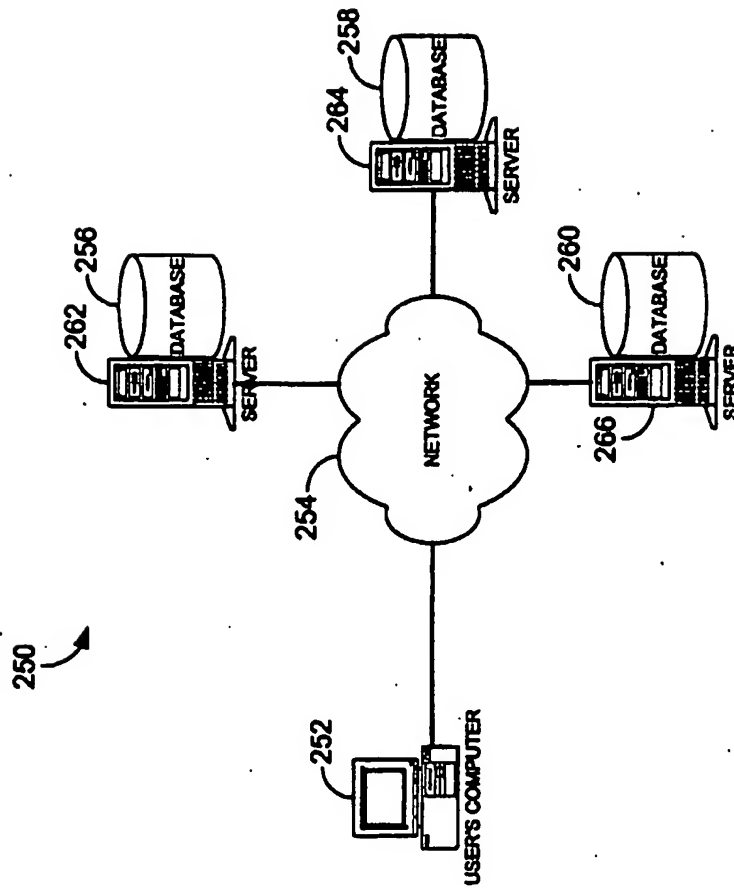


Figure 3

TBLASTN 2.0.13

Query= RPA05873 [Pseudomonas aeruginosa] Contig46_149439_147766
 ACETOLACTATE SYNTHASE LARGE SUBUNIT (EC 4.1.3.18)
 (558 letters)

<p>

Database: GenBank Human EST entries
 2,114,308 sequences; 797,293,801 total letters

Sequences producing significant alignments:		Score	E
		(bits)	Value
gb AW732672.1	AW732672 bb11a04.y1 NIH_MGC_8 Homo sapiens cDNA cl...	98	1e-19
gb AI027531.1	AI027531 ow52c03.x1 Soares_parathyroid_tumor_NbHFA...	90	3e-17
gb AW301111.1	AW301111 xk13b12.x1 HCl_CGAP_Co20 Homo sapiens cDN...	82	6e-15
gb AW271472.1	AW271472 xs09e04.x1 HCl_CGAP_Kid11 Homo sapiens cD...	81	1e-14
gb AI188869.1	AI188869 qd27b09.x1 Soares_placenta_8to9weeks_2NbH...	78	9e-14
gb AI566186.1	AI566186 tq69e07.x1 HCl_CGAP_Lu19 Homo sapiens cDN...	78	1e-13
gb BE046629.1	BE046629 hn41b11.x1 HCl_CGAP_RDF2 Homo sapiens cDN...	77	3e-13
gb AI150763.1	AI150763 qc06e05.x1 Soares_fetal_heart_NbHH19W Hom...	70	2e-11
gb AA071233.1	AA071233 xm73b02.r1 Stratagene_neuroepithelium (#9...	65	1e-09
gb AA306411.1	AA306411 EST177435 Jurkat T-cells VI Homo sapiens ...	65	1e-09

Score = 98.0 bits (325), Expect = 1e-19
 Identities = 60/175 (34%), Positives = 88/175 (50%)
 Frame = +2

Query: 14 RGGQILVEALRRAVDTVYICPGESYLFVLDALYDTDGIRTVVTRHGAASEMDAYGK 73
 R+GG+ + LR + V ++ + G P+L A + GIR V TRH ADA +
 Sbjct: 8 REGGENVAAVLRANGVRFIPTLVGGHISPLLAC-EKLGIRVVDTRHEVTGVFAADAMAR 184

Query: 74 LTGRPGICFVTRGPGATHAANGVETAQQDSTPMILFVGQVESAFKGREAFQEVDTVQMF8 133
 L+G G+ VT GPG T+ V AQ +P++L G + + R A Q VD + +F
 Sbjct: 185 LSGTVGVAAVTAGPGLTNTVTAVKRAQAQSPILLGGAASTLLQHRGALQAVDQLSLFR 364

Query: 134 GLAKWAVEIDRIERIPESIVGRAFSVATSGRPGFVVVALPKEILFGSAQVADAFEP 188
 L K+ V + R+ I + + A SG PGFV V LP ++L+ V P
 Sbjct: 365 PLKFCVSVPRVRDIVPTLRADMAAQSCTPGFVFLPVDVLYPFFWVQKENVF 529

TBLASTN 2.0.13

Figure 4

Query= RPA07079 [Pseudomonas aeruginosa] Contig51_766001_766489
 ACETOLACTATE SYNTHASE SMALL SUBUNIT (EC 4.1.3.18)
 (163 letters)

<p>

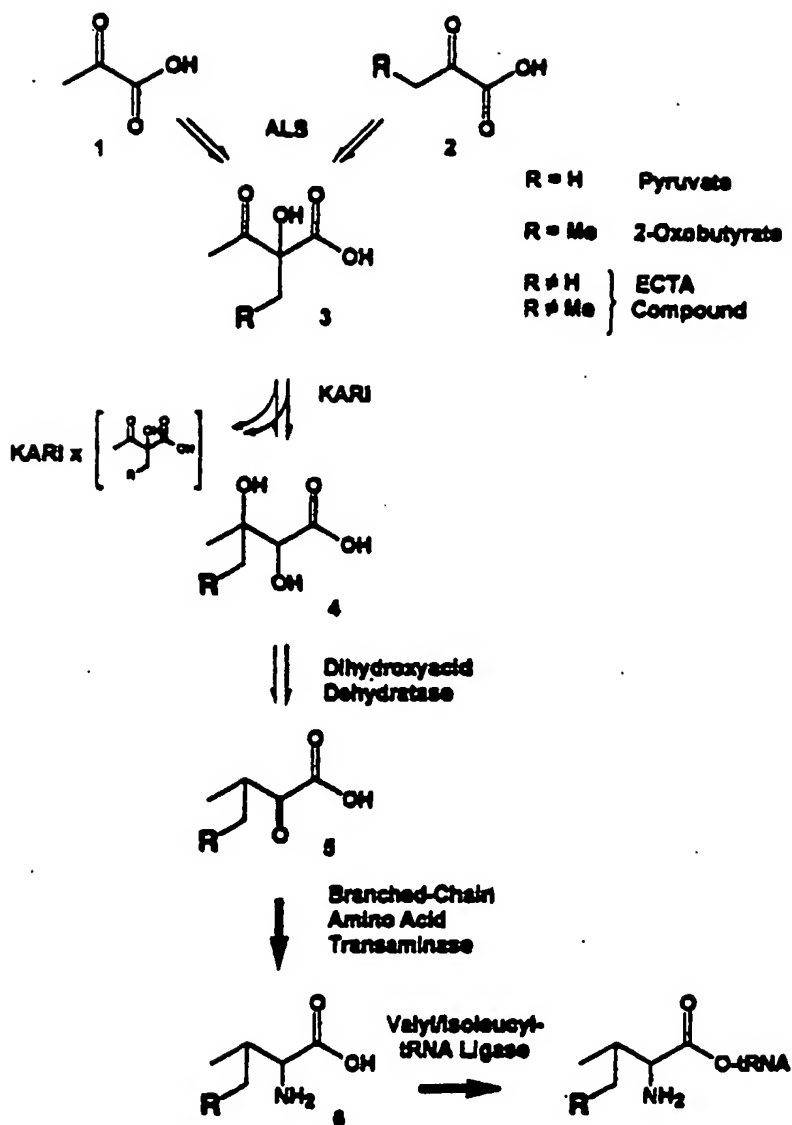
Database: GenBank Human EST entries
 2,114,308 sequences; 797,293,801 total letters

Score E
 Sequences producing significant alignments: (bits) Value
 gb|AI444621.1|AI444621 FLC6554 Human fetal liver cDNA library Ho... 30 6.5

Score = 29.6 bits (87), Expect = 6.5
 Identities = 18/54 (33%), Positives = 24/54 (44%)
 Frame = +3

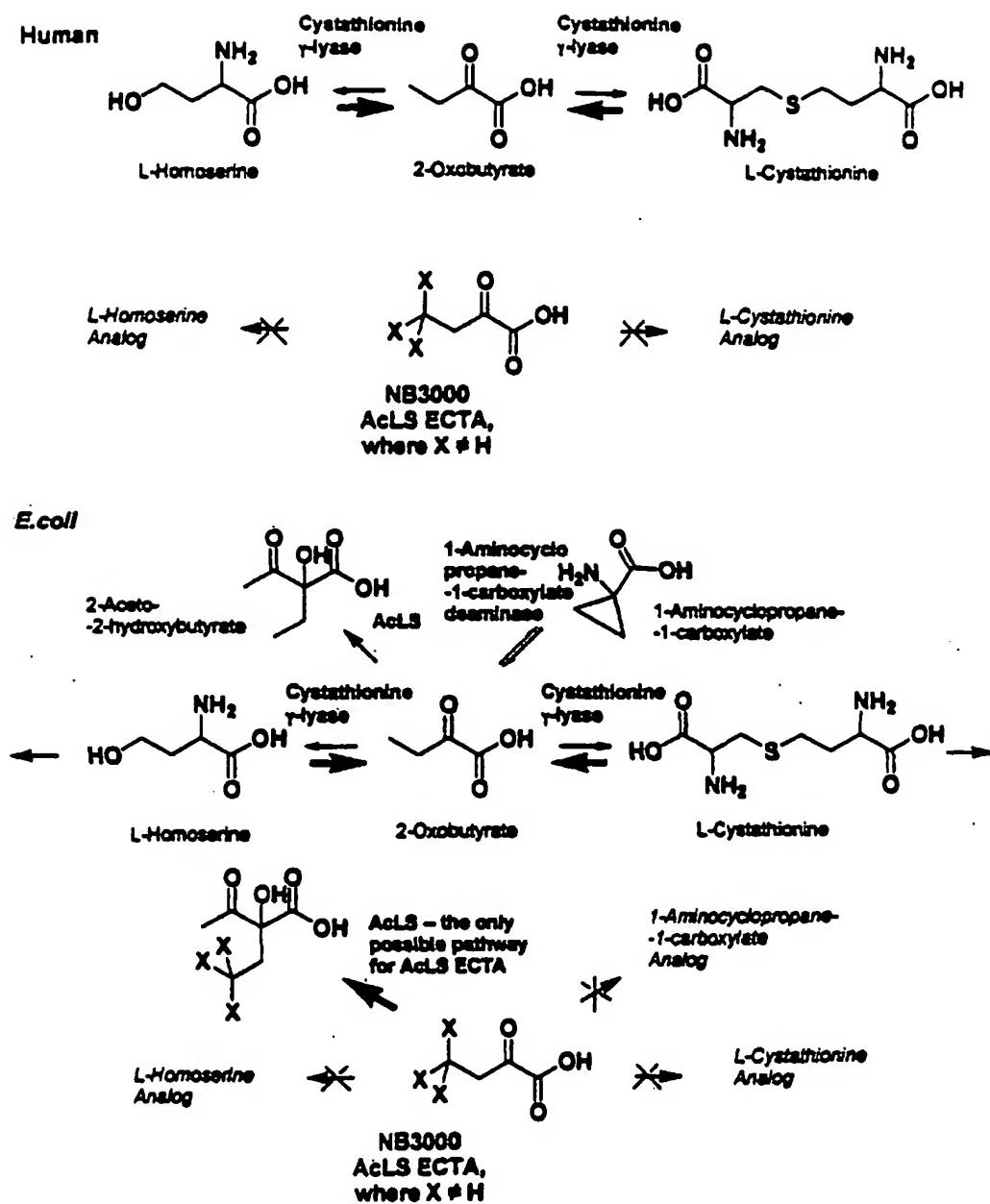
Query: 7 L L L E N E P Q A L S R V V G L F S Q R N I N I E S L T V A P T E D P L R L T L T T V G H D E V I E Q I 60
 L L L + P Q + + L + R N E A D P L + G H E V + I
 Sbjct: 72 L L L L S L P Q L A N G I T I L L T O R H L T T T F D P A G G G D P I L Y Q H L F * I F G H P E V Y H R I 233

Figure 5



Proposed mechanism of action of AcLS ECTA Compound. Arrow pairs denote pathways present in bacteria and plants. Bold arrows denote general pathways (present in all organisms). Each step following the AcLS catalyzed formation of (3) could lead to formation of a toxic metabolite. The mechanism of toxicity could be via inhibition of the enzymes in the next steps of the metabolic pathway or via incorporation into cellular protein, resulting in nonfunctional products.

Figure 6



Comparison of 2-oxobutyrate metabolism in humans and E.coli. The arrows indicate equilibrium between substrate and product.

Figure 7A

I_1_1_103 7706 *Yersinia pseudotuberculosis* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 171 *Yersinia pestis* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 7391 *Vibrio cholerae* El Tor N16961ORFA00618 THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 1685 *Salmonella typhimurium* tdh THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 1142 *Salmonella typhi* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 5894 *Salmonella paratyphi* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 1462 *Salmonella enteritidis* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 331 *Pasteurella multocida* D-BETA-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_30) / THREONINE 3-DEHYDROGENASE (EC I_1_1_103) / 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_103 2117 *Klebsiella pneumoniae* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 2118 *Klebsiella pneumoniae* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 2151 *Haemophilus influenzae* HI1010 D-BETA-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_30) / THREONINE 3-DEHYDROGENASE (EC I_1_1_103) / 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_103 6103 *Escherichia coli* tdh THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 2672 *Clostridium difficile* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_103 1699 *Bacillus subtilis* tdh THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_117 5819 *Saccharomyces cerevisiae* ARA1 D-ARABINOSE DEHYDROGENASE [NAD(P)+] HEAVY CHAIN (EC I_1_1_117)
 I_1_1_122 1990 *Staphylococcus aureus* BS-yqkF D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 6068 *Salmonella typhimurium* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 3300 *Salmonella typhi* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 5201 *Salmonella typhi* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 4176 *Salmonella enteritidis* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 325 *Salmonella dublin* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 6860 *Saccharomyces cerevisiae* YMR041C D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 2545 *Mycobacterium leprae*trj007152 D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 1579 *Klebsiella pneumoniae* D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 2923 *Escherichia coli* b3001 D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 4461 *Escherichia coli* b0419 D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 5090 *Escherichia coli* b1771 D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 4333 *Bordetella pertussis* BS-yqkF D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 5664 *Bordetella bronchiseptica* BS-yqkF D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 278 *Bacillus subtilis* yckK D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_122 2358 *Bacillus subtilis* yqkF D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_125 5491 *Yersinia pseudotuberculosis* EC-kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 6226 *Yersinia pseudotuberculosis* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 7387 *Yersinia pseudotuberculosis* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 3506 *Yersinia pestis* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 4839 *Yersinia pestis* EC-kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 4925 *Yersinia pestis* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 61 *Streptococcus pyogenes* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 1408 *Streptococcus pneumoniae* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 1132 *Streptococcus equi* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 5026 *Salmonella typhimurium* kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 2266 *Salmonella typhi* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 5126 *Salmonella paratyphi* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 2704 *Salmonella enteritidis* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 2728 *Salmonella dublin* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 6850 *Pseudomonas aeruginosa* PA4098 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 1913 *Klebsiella pneumoniae* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)
 I_1_1_125 1914 *Klebsiella pneumoniae* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC I_1_1_125)

1_1_1_125 8034 *Klebsiella pneumoniae* 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_125 5650 *Escherichia coli* b2774 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_125 5692 *Escherichia coli* kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_125 1509 *Enterococcus faecium* (DOE) 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_125 3086 *Clostridium acetobutylicum* 36229712_F1_2 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_125 2211 *Bacillus subtilis* kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE (EC 1_1_1_125)
 1_1_1_128 2873 *Salmonella typhimurium* idnD L-idonate 2-dehydrogenase (EC 1_1_1_128)
 1_1_1_128 2041 *Salmonella paratyphi* L-idonate 2-dehydrogenase (EC 1_1_1_128)
 1_1_1_128 2959 *Salmonella enteritidis* L-idonate 2-dehydrogenase (EC 1_1_1_128)
 1_1_1_128 4368 *Salmonella enteritidis* L-idonate 2-dehydrogenase (EC 1_1_1_128)
 1_1_1_128 6406 *Escherichia coli* yjgV L-idonate 2-dehydrogenase (EC 1_1_1_128)
 1_1_1_132 1698 *Pseudomonas aeruginosa* algD GDP-MANNOSE 6-DEHYDROGENASE (EC 1_1_1_132)
 1_1_1_133 576 *Streptococcus pyogenes* rmlD DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 184 *Streptococcus mutans* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 176 *Streptococcus equi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 6492 *Salmonella typhimurium* rfbD DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 904 *Salmonella typhi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 906 *Salmonella typhi* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 4889 *Salmonella paratyphi* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 4890 *Salmonella paratyphi* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 3590 *Salmonella enteritidis* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 3295 *Salmonella dublin* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 326 *Rickettsia prowazekii* RP332 DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1319 *Pseudomonas aeruginosa* rmlD DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 3267 *Pseudomonas aeruginosa* PA4069 DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1382 *Porphyromonas gingivalis* BS-spsK DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1383 *Porphyromonas gingivalis* EC-rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1967 *Porphyromonas gingivalis* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1441 *Neisseria gonorrhoeae* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 2871 *Mycobacterium tuberculosis* rmlD DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 2391 *Mycobacterium leprae* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1968 *Mycobacterium bovis* BS-spsK DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 433 *Klebsiella pneumoniae* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1661 *Klebsiella pneumoniae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 4831 *Klebsiella pneumoniae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 5235 *Escherichia coli* rfbD DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 411 *Enterococcus faecium* (DOE) DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 513 *Enterococcus faecalis* EC-rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 515 *Enterococcus faecalis* DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 392 *Corynebacterium diphtheriae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 360 *Clostridium acetobutylicum* 33406693_F2_52 DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1166 *Clostridium acetobutylicum* 5865681_C2_40 DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 1_1_1_133 1962 *Clostridium acetobutylicum* 4884636_C2_37 DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

I_1_1_133 2505 *Clostridium acetobutylicum* I367952_C3_18 DTD4-DEHYDRORHAMNOSE 3,5-
 EPIMERASE (EC 5_1_3_13) / DTD4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 I_1_1_133 3570 *Bordetella pertussis* DTD4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 I_1_1_133 7039 *Bordetella bronchiseptica* DTD4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) /
 DTD4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 I_1_1_133 3775 *Bacillus subtilis* spsK DTD4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) /
 DTD4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 I_1_1_140 689 *Streptococcus mutans* JQ9X671 SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 1_1_1_140)
 I_1_1_140 4868 *Salmonella typhimurium* gutD SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 1_1_1_140)
 I_1_1_140 941 *Salmonella typhi* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 2300 *Salmonella paratyphi* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 2301 *Salmonella paratyphi* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 1218 *Pasteurella multocida* EC-srID SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 1_1_1_140)
 I_1_1_140 356 *Klebsiella pneumoniae* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 3427 *Klebsiella pneumoniae* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 3428 *Klebsiella pneumoniae* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 2633 *Escherichia coli* srID SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 2372 *Enterococcus faecium* (DOE) SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 1_1_1_140)
 I_1_1_140 1656 *Enterococcus faecalis* SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC 1_1_1_140)
 I_1_1_140 1378 *Clostridium difficile* EC-srID SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 1_1_1_140)
 I_1_1_154 5678 *Salmonella typhimurium* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 6615 *Salmonella typhimurium* alID UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 4079 *Salmonella typhi* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 5627 *Salmonella paratyphi* ureidoglycollate dehydrogenase (EC 1_1_1_154)
 I_1_1_154 3899 *Salmonella enteritidis* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 4527 *Salmonella dublin* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 4706 *Salmonella dublin* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 6943 *Klebsiella pneumoniae* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 6944 *Klebsiella pneumoniae* ureidoglycollate dehydrogenase (EC 1_1_1_154)
 I_1_1_154 4504 *Escherichia coli* b0517 UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 2528 *Bordetella pertussis* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 8196 *Bordetella bronchiseptica* UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_154 1233 *Bacillus subtilis* yjmc UREIDOGLYCOLATE DEHYDROGENASE (EC 1_1_1_154)
 I_1_1_157 2474 *Pseudomonas aeruginosa* PA1628 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 2646 *Pseudomonas aeruginosa* PA3590 PROBABLE 3-HYDROXYBUTYRYL-COA
 DEHYDROGENASE (EC 1_1_1_157)
 I_1_1_157 1517 *Porphyromonas gingivalis* BS-mmGB 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 3584 *Mycobacterium tuberculosis* fadB3 PROBABLE 3-HYDROXYBUTYRYL-COA
 DEHYDROGENASE (EC 1_1_1_157)
 I_1_1_157 5511 *Mycobacterium tuberculosis* fadB2 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 2412 *Mycobacterium leprae* BS-mmGB 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 126 *Mycobacterium bovis* PROBABLE 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 701 *Mycobacterium bovis* BS-mmGB 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 6325 *Klebsiella pneumoniae* PROBABLE 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 6326 *Klebsiella pneumoniae* PROBABLE 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 1355 *Escherichia coli* b1395 PROBABLE 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)
 I_1_1_157 575 *Clostridium difficile* BS-mmGB 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 1_1_1_157)

I_1_I_157 528 *Clostridium acetobutylicum* 30084417_C1_70 3-HYDROXYBUTYRYL-COA
 DEHYDROGENASE (EC I_1_I_157)
 I_1_I_157 1700 *Bordetella pertussis* 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC I_1_I_157)
 I_1_I_157 2975 *Bordetella pertussis* 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC I_1_I_157)
 I_1_I_157 5148 *Bordetella bronchiseptica* 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC I_1_I_157)
 I_1_I_157 6474 *Bordetella bronchiseptica* 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC I_1_I_157)
 I_1_I_157 2411 *Bacillus subtilis* mmgB 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC I_1_I_157)
 I_1_I_158 6211 *Yersinia pseudotuberculosis* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 2178 *Yersinia pestis* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE
 (EC I_1_I_158)
 I_1_I_158 4193 *Vibrio cholerae* El Tor N16961 ORF00448 UDP-N-
 ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC I_1_I_158)
 I_1_I_158 375 *Treponema pallidum* TP0047 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 409 *Treponema pallidum* TP0090 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 946 *Streptococcus pyogenes* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 1278 *Streptococcus pneumoniae* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 632 *Streptococcus equi* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 1285 *Staphylococcus aureus* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 608 *Salmonella typhimurium* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 1965 *Salmonella typhi* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 5017 *Salmonella paratyphi* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 5018 *Salmonella paratyphi* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 5019 *Salmonella paratyphi* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 2844 *Salmonella enteritidis* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 2910 *Salmonella dublin* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 242 *Rickettsia prowazekii* RP248 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 6346 *Pseudomonas aeruginosa* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 566 *Porphyromonas gingivalis* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 346 *Pasteurella multocida* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE
 (EC I_1_I_158)
 I_1_I_158 1130 *Neisseria gonorrhoeae* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 3358 *Mycobacterium tuberculosis* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 392 *Mycobacterium leprae* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 686 *Mycobacterium bovis* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)
 I_1_I_158 1643 *Mycobacterium bovis* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_I_158)
 I_1_I_158 6404 *Klebsiella pneumoniae* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE
 (EC I_1_I_158)
 I_1_I_158 805 *Helicobacter pylori* HP1418 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_I_158)

I_1_1_158 1302 *Helicobacter pylori* J99sp|Q9ZJJ4 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 7840 *Haemophilus influenzae* HI0268 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 1300 *Haemophilus ducreyi* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 3866 *Escherichia coli* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE
 (EC I_1_1_158)
 I_1_1_158 4029 *Enterococcus faecium* (DOE) UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 1336 *Enterococcus faecalis* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_1_158)
 I_1_1_158 1577 *Enterococcus faecalis* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_1_158)
 I_1_1_158 2090 *Corynebacterium diphtheriae* UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 16 *Clostridium difficile* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 1206 *Clostridium difficile* BS-yaaR UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 370 *Clostridium acetobutylicum* 23470001_C1_122 UDP-N-
 ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC I_1_1_158)
 I_1_1_158 1571 *Clostridium acetobutylicum* 25673593_F3_14 UDP-N-
 ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC I_1_1_158)
 I_1_1_158 795 *Chlamydia trachomatis* D/UW-3/Cx murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 867 *Chlamydia pneumoniae* AR39 CP0867 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 914 *Chlamydia pneumoniae* CWL029 murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 1015 *Campylobacter jejuni* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 159 *Borrelia burgdorferi* BB0598 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 496 *Borrelia burgdorferi* BB0244 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 1014 *Bordetella pertussis* sp|Q9X6Y8 UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 8320 *Bordetella bronchiseptica* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_158 30 *Bacillus subtilis* yaaR UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE (EC
 I_1_1_158)
 I_1_1_158 1524 *Bacillus subtilis* murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE REDUCTASE
 (EC I_1_1_158)
 I_1_1_159 3149 *Mycobacterium tuberculosis* Rv3485c 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE
 (EC I_1_1_159)
 I_1_1_159 3376 *Mycobacterium bovis* EC-yciK 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC
 I_1_1_159)
 I_1_1_159 420 *Helicobacter pylori* HP1014 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC
 I_1_1_159)
 I_1_1_159 411 *Helicobacter pylori* J99 jhp0409 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC
 I_1_1_159)
 I_1_1_159 5014 *Escherichia coli* hdhA 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC I_1_1_159)
 I_1_1_159 853 *Clostridium difficile* 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC I_1_1_159)
 I_1_1_159 423 *Campylobacter jejuni* Cj0807 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC
 I_1_1_159)
 I_1_1_159 3762 *Bacillus subtilis* ywfH 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE (EC I_1_1_159)
 I_1_1_169 3121 *Yersinia pestis* EC-apbA 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 5469 *Yersinia pestis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 6075 *Vibrio cholerae* El Tor N16961 ORF02923 2-DEHYDROPANTOATE 2-REDUCTASE (EC
 I_1_1_169)
 I_1_1_169 882 *Streptococcus pyogenes* apbA 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)

I_1_1_169 257 *Streptococcus equi* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2397 *Staphylococcus aureus* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2951 *Staphylococcus aureus* BS-ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 147 *Salmonella typhimurium* panE 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 5787 *Salmonella typhimurium* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 3029 *Salmonella typhi* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 3464 *Salmonella typhi* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 4717 *Salmonella paratyphi* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 5020 *Salmonella paratyphi* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 1578 *Salmonella enteritidis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 3669 *Salmonella dublin* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 3744 *Salmonella dublin* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 7955 *Pseudomonas aeruginosa* panE 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 75 *Porphyromonas gingivalis* BS-ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 483 *Mycobacterium tuberculosis* Rv2573 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2354 *Mycobacterium leprae* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 3913 *Mycobacterium bovis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2133 *Klebsiella pneumoniae* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2134 *Klebsiella pneumoniae* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 6763 *Klebsiella pneumoniae* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 4466 *Escherichia coli* apbA 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 1579 *Enterococcus faecium* (DOE) 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 8 *Enterococcus faecalis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 855 *Enterococcus faecalis* BS-ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2514 *Enterococcus faecalis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 191 *Corynebacterium diphtheriae* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 1096 *Clostridium difficile* BS-ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2472 *Clostridium acetobutylicum* 6025443_F2_7 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2668 *Clostridium acetobutylicum* 34656267_F2_3 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 2719 *Bordetella pertussis* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 5764 *Bordetella bronchiseptica* 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 9126 *Bordetella bronchiseptica* BS-ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 1445 *Bacillus subtilis* ykpB 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_169 1512 *Bacillus subtilis* ylbQ 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_17 2665 *Yersinia pestis* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 7546 *Vibrio cholerae* El Tor N16961ORFA00818 MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 29 *Streptococcus pneumoniae* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 121 *Streptococcus mutans* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 1944 *Staphylococcus aureus* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 5960 *Salmonella typhimurium* mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3221 *Salmonella typhi* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 4807 *Salmonella paratyphi* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 4808 *Salmonella paratyphi* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 4809 *Salmonella paratyphi* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3745 *Salmonella enteritidis* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 2641 *Salmonella dublin* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 1800 *Pasteurella multocida* mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 191 *Mycoplasma pneumoniae* MP190 MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3644 *Klebsiella pneumoniae* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3645 *Klebsiella pneumoniae* MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3520 *Escherichia coli* mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_17 3086 *Enterococcus faecium* (DOE) MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)

1_1_1_17 1316 *Enterococcus faecalis* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC 1_1_1_17)
 1_1_1_17 2680 *Clostridium difficile* EC-mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC 1_1_1_17)
 1_1_1_17 2183 *Clostridium acetobutylicum* 5135967_C1_17 MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC 1_1_1_17)
 1_1_1_17 400 *Bacillus subtilis* mtID MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC 1_1_1_17)
 1_1_1_179 6589 *Yersinia pseudotuberculosis* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1516 *Yersinia pestis* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 62 *Streptococcus pyogenes* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1495 *Streptococcus pneumoniae* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1496 *Streptococcus pneumoniae* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 785 *Streptococcus mutans* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1131 *Streptococcus equi* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1871 *Salmonella typhimurium* ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 2667 *Salmonella typhi* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 4759 *Salmonella paratyphi* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 5732 *Saccharomyces cerevisiae* GRE3 D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1588 *Pasteurella multocida* BS-yvaA TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 3746 *Klebsiella pneumoniae* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 3747 *Klebsiella pneumoniae* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 6415 *Klebsiella pneumoniae* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 3010 *Escherichia coli* ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 3017 *Enterococcus faecium* (DOE) TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 551 *Enterococcus faecalis* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1595 *Enterococcus faecalis* BS-yrbE TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 2127 *Enterococcus faecalis* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 2678 *Enterococcus faecalis* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 1554 *Clostridium difficile* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 2661 *Clostridium acetobutylicum* 26853425_C2_14 TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 2712 *Clostridium acetobutylicum* 2349088_F3_11 TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 4327 *Clostridium acetobutylicum* TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_179 3111 *Bacillus subtilis* yulF TRANS-1,2-DIHYDROBENZENE-1,2-DIOL DEHYDROGENASE (EC 1_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC 1_1_1_179)
 1_1_1_18 6536 *Yersinia pseudotuberculosis* BS-yvaA MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 7739 *Yersinia pseudotuberculosis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 8177 *Yersinia pseudotuberculosis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 8181 *Yersinia pseudotuberculosis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)

1_1_1_18 158 *Yersinia pestis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 1656 *Yersinia pestis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 3447 *Yersinia pestis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 3448 *Yersinia pestis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 6618 *Vibrio cholerae* El Tor N16961ORFA01017 MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 1715 *Streptococcus pneumoniae* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 2479 *Salmonella typhimurium* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 2619 *Salmonella typhimurium* ydgJ MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 5481 *Salmonella typhimurium* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 3422 *Salmonella paratyphi* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 1474 *Salmonella enteritidis* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 2953 *Klebsiella pneumoniae* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 6412 *Klebsiella pneumoniae* MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 1084 *Bacillus subtilis* yisS MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 2771 *Bacillus subtilis* yrbE MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_18 3963 *Bacillus subtilis* iolG MYO-INOSITOL 2-DEHYDROGENASE (EC 1_1_1_18)
 1_1_1_193 4162 *Yersinia pseudotuberculosis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 2738 *Yersinia pestis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 6045 *Vibrio cholerae* El Tor N16961 ORF02878
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 1209 *Streptococcus pneumoniae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 2886 *Staphylococcus aureus* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 3817 *Staphylococcus aureus* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 5139 *Salmonella typhimurium* ribG
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 4789 *Salmonella typhi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 4743 *Salmonella paratyphi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 4744 *Salmonella paratyphi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 5325 *Saccharomyces cerevisiae* RIB7 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 1372 *Pseudomonas aeruginosa* ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 3169 *Pseudomonas aeruginosa* PA3469 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 1441 *Porphyromonas gingivalis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 1_1_1_193 669 *Pasteurella multocida* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)

I_1_1_193 1383 *Neisseria gonorrhoeae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 418 *Mycobacterium tuberculosis* ribG
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1752 *Mycobacterium leprae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1230 *Mycobacterium bovis* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1404 *Mycobacterium bovis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1440 *Klebsiella pneumoniae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1441 *Klebsiella pneumoniae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 8204 *Klebsiella pneumoniae* 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 885 *Helicobacter pylori* HP1505 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1385 *Helicobacter pylori* J99tr|Q9ZJB5
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 2004 *Haemophilus influenzae* HI0944
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 694 *Haemophilus ducreyi* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 398 *Escherichia coli* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1195 *Enterococcus faecalis* BS-ywjB 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 992 *Corynebacterium diphtheriae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 3269 *Clostridium difficile* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1406 *Clostridium acetobutylicum* 16182701_C1_42
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 1815 *Clostridium acetobutylicum* 24020077_C1_29 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 699 *Chlamydia trachomatis* D/UW-3/Cx EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 998 *Chlamydia pneumoniae* AR39 CP0998
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 I_1_1_193 803 *Chlamydia pneumoniae* CWL029 EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)

I_1_1_193 936 *Campylobacter jejuni* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE
 DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC
 I_1_1_193)
 I_1_1_193 1610 *Bordetella pertussis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE
 DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC
 I_1_1_193)
 I_1_1_193 8367 *Bordetella bronchiseptica* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-
 (5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC I_1_1_193)
 I_1_1_193 2324 *Bacillus subtilis* ribG DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE
 DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC
 I_1_1_193)
 I_1_1_193 3717 *Bacillus subtilis* ywjB 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE
 (EC I_1_1_193)
 I_1_1_193 4070 *Bacillus subtilis* yyaP 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC
 I_1_1_193)
 I_1_1_195 3347 *Saccharomyces cerevisiae* YCR105W CINNAMYL-ALCOHOL DEHYDROGENASE (EC
 I_1_1_195)
 I_1_1_195 6078 *Saccharomyces cerevisiae* YMR318C CINNAMYL-ALCOHOL DEHYDROGENASE (EC
 I_1_1_195)
 I_1_1_202 721 *Streptococcus pneumoniae* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 3293 *Salmonella typhimurium* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 2625 *Salmonella typhi* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 43 *Salmonella paratyphi* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 44 *Salmonella paratyphi* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 45 *Salmonella paratyphi* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 2977 *Saccharomyces cerevisiae* ADH4 I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 8280 *Pseudomonas aeruginosa* PA1991 I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 74 *Klebsiella pneumoniae* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 5527 *Klebsiella pneumoniae* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 5528 *Klebsiella pneumoniae* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 6091 *Escherichia coli* yiaY I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 1007 *Enterococcus faecium* (DOE) I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 326 *Clostridium difficile* I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_202 1727 *Clostridium acetobutylicum* 26271965_F1_4 I,3-PROPANEDIOL DEHYDROGENASE (EC
 I_1_1_202)
 I_1_1_202 8447 *Bordetella bronchiseptica* BS-gbsB I,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_215 7594 *Yersinia pseudotuberculosis* EC-yiaE gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 1249 *Yersinia pestis* EC-yiaE gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 2566 *Salmonella typhi* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 1320 *Salmonella paratyphi* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 6327 *Pseudomonas aeruginosa* PA2263 gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 506 *Porphyromonas gingivalis* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 1847 *Klebsiella pneumoniae* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 1848 *Klebsiella pneumoniae* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 6512 *Escherichia coli* yiaE gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 3953 *Bordetella pertussis* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_215 8205 *Bordetella bronchiseptica* gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_218 1521 *Staphylococcus aureus* MORPHINE 6-DEHYDROGENASE (EC I_1_1_218)
 I_1_1_218 2935 *Salmonella typhimurium* MORPHINE 6-DEHYDROGENASE (EC I_1_1_218)
 I_1_1_218 5098 *Escherichia coli* b1781 MORPHINE 6-DEHYDROGENASE (EC I_1_1_218)
 I_1_1_23 7518 *Yersinia pseudotuberculosis* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 364 *Yersinia pestis* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 4959 *Vibrio cholerae* El Tor N16961 ORF01478 HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1158 *Streptococcus mutans* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1479 *Staphylococcus aureus* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 505 *Salmonella typhimurium* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 6941 *Salmonella typhimurium* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 4486 *Salmonella typhi* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1571 *Salmonella paratyphi* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1572 *Salmonella paratyphi* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1573 *Salmonella paratyphi* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)

I_1_1_23 980 *Salmonella enteritidis* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 3213 *Salmonella dublin* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 6837 *Saccharomyces cerevisiae* HIS4 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 463 *Pseudomonas aeruginosa* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1890 *Pasteurella multocida* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 14 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 15 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 172 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 55 *Neisseria gonorrhoeae* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 2639 *Mycobacterium tuberculosis* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1687 *Mycobacterium leprae* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 2254 *Mycobacterium bovis* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 7760 *Klebsiella pneumoniae* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 7761 *Klebsiella pneumoniae* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 4636 *Haemophilus influenzae* HI0469 HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1968 *Escherichia coli* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 370 *Corynebacterium diphtheriae* HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 1828 *Clostridium difficile* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 2129 *Clostridium acetobutylicum* I383588_C3_39 HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 893 *Campylobacter jejuni* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 761 *Bordetella pertussis* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 9514 *Bordetella bronchiseptica* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_23 3486 *Bacillus subtilis* hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_233 5523 *Yersinia pseudotuberculosis* N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC I_1_1_233)
 I_1_1_233 3768 *Yersinia pestis* N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC I_1_1_233)
 I_1_1_233 2795 *Mycobacterium tuberculosis* Rv3559c N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC I_1_1_233)
 I_1_1_233 2262 *Mycobacterium bovis* N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC I_1_1_233)
 I_1_1_233 3116 *Bacillus subtilis* yuxG N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC I_1_1_233)
 I_1_1_236 4453 *Bordetella pertussis* TROPINONE REDUCTASE-II (EC I_1_1_236)
 I_1_1_24 246 *Neurospora crassa* qa-3 QUINATE 5-DEHYDROGENASE (EC I_1_1_24)
 I_1_1_244 1536 *Streptococcus pneumoniae* NAD-DEPENDENT METHANOL DEHYDROGENASE (EC I_1_1_244)
 I_1_1_245 4533 *Mycobacterium tuberculosis* Rv0851c cyclohexanol dehydrogenase (EC I_1_1_245)
 I_1_1_25 5471 *Yersinia pseudotuberculosis* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 7159 *Yersinia pseudotuberculosis* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 484 *Yersinia pestis* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 951 *Yersinia pestis* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3940 *Vibrio cholerae* El Tor N16961 ORF00094 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 639 *Streptococcus pyogenes* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1155 *Streptococcus pyogenes* aroE_2 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 385 *Streptococcus pneumoniae* BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1621 *Streptococcus mutans* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1385 *Streptococcus equi* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1342 *Staphylococcus aureus* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2211 *Staphylococcus aureus* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1219 *Salmonella typhimurium* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2023 *Salmonella typhimurium* ydiB SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2080 *Salmonella typhimurium* hi0607 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 32 *Salmonella typhi* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 5581 *Salmonella typhi* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 5942 *Salmonella paratyphi* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2869 *Salmonella enteritidis* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3001 *Salmonella enteritidis* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)

I_1_1_25 3567 *Salmonella dublin* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 715 *Pseudomonas aeruginosa* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 6801 *Pseudomonas aeruginosa* PA0244 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1362 *Porphyromonas gingivalis* BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 116 *Pasteurella multocida* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 211 *Pasteurella multocida* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2108 *Neisseria gonorrhoeae* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 147 *Mycobacterium tuberculosis* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 439 *Mycobacterium leprae* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3160 *Mycobacterium bovis* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 821 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3809 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3810 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 3811 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 5997 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 5998 *Klebsiella pneumoniae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 644 *Helicobacter pylori* HP1249 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1159 *Helicobacter pylori* J99spJQ9ZJX8 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 4955 *Haemophilus influenzae* HI0607 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 20520 *Haemophilus influenzae* HI0655 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 785 *Haemophilus ducreyi* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1649 *Escherichia coli* ydiB SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 5912 *Escherichia coli* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2220 *Enterococcus faecium* (DOE) SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1358 *Enterococcus faecalis* BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 440 *Corynebacterium diphtheriae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 748 *Corynebacterium diphtheriae* SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2021 *Clostridium difficile* EC-ydiB SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2416 *Clostridium difficile* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 1755 *Clostridium acetobutylicum* 25396927_F1_6 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 352 *Chlamydia trachomatis* D/UW-3/Cx BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 817 *Chlamydia pneumoniae* AR39 CP0817 SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 957 *Chlamydia pneumoniae* CWL029 BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2420 *Campylobacter jejuni* aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2424 *Bordetella pertussis* BS-aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_25 2559 *Bacillus subtilis* aroD SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_250 6682 *Yersinia pseudotuberculosis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 7943 *Yersinia pseudotuberculosis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 3204 *Yersinia pestis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 4915 *Yersinia pestis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 5193 *Yersinia pestis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 2018 *Streptococcus equi* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 3064 *Klebsiella pneumoniae* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 3065 *Klebsiella pneumoniae* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 3066 *Klebsiella pneumoniae* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 14547 *Haemophilus influenzae* HI0048 D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_250 1236 *Bacillus subtilis* yjmF D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE FORMING) (EC I_1_1_250)
 I_1_1_251 3106 *Salmonella typhi* GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_251)
 I_1_1_251 5809 *Salmonella paratyphi* GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_251)
 I_1_1_251 5811 *Salmonella paratyphi* GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_251)
 I_1_1_251 2345 *Klebsiella pneumoniae* GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_251)

I_1_1_251 5271 *Escherichia coli* gatD GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_251)
 I_1_1_28 6363 *Yersinia pseudotuberculosis* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 6474 *Yersinia pseudotuberculosis* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 1420 *Yersinia pestis* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2857 *Yersinia pestis* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 6708 *Vibrio cholerae* El Tor N16961ORFA01138 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 367 *Treponema pallidum* TP0037 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 843 *Streptococcus pyogenes* ddh D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 3472 *Staphylococcus aureus*trP72357 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 3846 *Staphylococcus aureus* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 4064 *Salmonella typhimurium* dld D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 6250 *Salmonella typhimurium* htpH D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 331 *Salmonella typhi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 3143 *Salmonella typhi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2071 *Salmonella paratyphi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2707 *Salmonella paratyphi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2708 *Salmonella paratyphi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2709 *Salmonella paratyphi* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 411 *Salmonella enteritidis* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 1051 *Salmonella dublin* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 4261 *Salmonella dublin* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 5556 *Pseudomonas aeruginosa* ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 20025 *Neurospora crassa* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 302 *Neisseria gonorrhoeae* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 1461 *Neisseria gonorrhoeae* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 4454 *Klebsiella pneumoniae* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 7297 *Klebsiella pneumoniae* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 7298 *Klebsiella pneumoniae* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 7299 *Klebsiella pneumoniae* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 11126 *Haemophilus influenzae* H11649 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 14472 *Haemophilus influenzae* H10085 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2082 *Escherichia coli* dld D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 4897 *Escherichia coli* ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 253 *Enterococcus faecium* (DOE) D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2413 *Enterococcus faecalis* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 3343 *Clostridium difficile* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 2878 *Clostridium acetobutylicum* 242937_F2_4 D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 322 *Bordetella pertussis* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_28 6665 *Bordetella bronchiseptica* D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_29 6261 *Vibrio cholerae* El Tor N16961 ORF03166 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 853 *Saccharomyces cerevisiae* YGL185C GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 8128 *Saccharomyces cerevisiae* YNL274C GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 4979 *Pseudomonas aeruginosa* hprA GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 1749 *Porphyromonas gingivalis* BS-yoaD GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 1729 *Neisseria gonorrhoeae* BS-yoaD GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 1053 *Helicobacter pylori* HP0096 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 92 *Helicobacter pylori* J99trQ9ZMX7 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 18618 *Haemophilus influenzae* H11556 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 1913 *Clostridium acetobutylicum* 3908561_C2_39 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 3079 *Clostridium acetobutylicum* 32421927_C1_11 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_29 3463 *Bacillus subtilis* yvcT GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_3 6039 *Yersinia pseudotuberculosis* EC-metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC I_1_1_3)
 I_1_1_3 7401 *Yersinia pseudotuberculosis* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC I_1_1_3)
 I_1_1_3 2352 *Yersinia pestis* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC I_1_1_3)
 I_1_1_3 5245 *Yersinia pestis* EC-metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC I_1_1_3)
 I_1_1_3 6131 *Vibrio cholerae* El Tor N16961 ORF02994 ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC I_1_1_3)

I_1_1_3 6432 *Vibrio cholerae* El Tor N16961 ORF03393 ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 1307 *Streptococcus pneumoniae* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 193 *Streptococcus equi* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 1314 *Staphylococcus aureus* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 3365 *Salmonella typhimurium* metM ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 3762 *Salmonella typhimurium* thrA2 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 389 *Salmonella typhi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 1334 *Salmonella typhi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 54 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 55 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 230 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 4368 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 4369 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 4371 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 4372 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 4373 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 1278 *Salmonella enteritidis* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 3151 *Salmonella dublin* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 3980 *Saccharomyces cerevisiae* HOM3 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 5916 *Saccharomyces cerevisiae* HOM6 HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 4170 *Pseudomonas aeruginosa* hom HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 472 *Pasteurella multocida* thrA ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 516 *Neisseria gonorrhoeae* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 909 *Mycobacterium tuberculosis* thrA HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 1203 *Mycobacterium leprae* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 1273 *Mycobacterium bovis* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 2295 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 2296 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 2297 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 2457 *Klebsiella pneumoniae* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 245 *Helicobacter pylori* HP0822 HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 760 *Helicobacter pylori* J99 hom HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 18061 *Haemophilus influenzae* HI0089 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 2 *Escherichia coli* thrA ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC 1_1_1_3)
 I_1_1_3 3838 *Escherichia coli* metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II (EC 1_1_1_3)
 I_1_1_3 2513 *Enterococcus faecalis* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 1380 *Corynebacterium diphtheriae* HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)
 I_1_1_3 1830 *Clostridium difficile* EC-metL HOMOSERINE DEHYDROGENASE (EC 1_1_1_3)

I_1_1_3 1561 *Clostridium acetobutylicum* 23570152_C1_27 HOMOSERINE DEHYDROGENASE (EC I_1_1_3)
 I_1_1_3 2052 *Campylobacter jejuni* hom HOMOSERINE DEHYDROGENASE (EC I_1_1_3)
 I_1_1_3 3120 *Bordetella pertussis* EC-metL HOMOSERINE DEHYDROGENASE (EC I_1_1_3)
 I_1_1_3 3221 *Bacillus subtilis* hom HOMOSERINE DEHYDROGENASE (EC I_1_1_3)
 I_1_1_31 7573 *Yersinia pseudotuberculosis* EC-yhaE 3-HYDROXYISOBUTYRATE DEHYDROGENASE
 PRECURSOR (EC I_1_1_31)
 I_1_1_31 2088 *Yersinia pestis* BS-ykwC 3-HYDROXYISOBUTYRATE DEHYDROGENASE PRECURSOR (EC
 I_1_1_31)
 I_1_1_31 3196 *Salmonella typhimurium* yihU 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 4067 *Salmonella typhi* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 3649 *Salmonella paratyphi* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 3831 *Salmonella paratyphi* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 5767 *Salmonella paratyphi* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 778 *Pseudomonas aeruginosa* PA2199 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 3200 *Pseudomonas aeruginosa* mmsB 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 7186 *Pseudomonas aeruginosa* PA3312 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 8099 *Pseudomonas aeruginosa* PA1576 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 8533 *Pseudomonas aeruginosa* PA0743 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 65 *Neisseria gonorrhoeae* BS-ykwC 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 871 *Mycobacterium tuberculosis* Rv0770 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 4180 *Mycobacterium tuberculosis* mmsB 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 790 *Mycobacterium bovis* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 1158 *Mycobacterium bovis* EC-yihU 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 8440 *Klebsiella pneumoniae* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 586 *Helicobacter pylori* J99trQ9ZLJ4 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 6230 *Escherichia coli* yihU 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 2744 *Enterococcus faecium* (DOE) 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 2827 *Enterococcus faecalis* BS-ykwC 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 2031 *Corynebacterium diphtheriae* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 3614 *Clostridium acetobutylicum* 21490878_C3_9 3-HYDROXYISOBUTYRATE DEHYDROGENASE
 (EC I_1_1_31)
 I_1_1_31 3603 *Bordetella pertussis* BS-ykwC 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 3922 *Bordetella pertussis* EC-yhaE 3-HYDROXYISOBUTYRATE DEHYDROGENASE PRECURSOR
 (EC I_1_1_31)
 I_1_1_31 4351 *Bordetella pertussis* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 5367 *Bordetella bronchiseptica* 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_31 5972 *Bordetella bronchiseptica* 3-HYDROXYISOBUTYRATE DEHYDROGENASE PRECURSOR
 (EC I_1_1_31)
 I_1_1_31 6990 *Bordetella bronchiseptica* 3-HYDROXYISOBUTYRATE DEHYDROGENASE PRECURSOR
 (EC I_1_1_31)
 I_1_1_31 7295 *Bordetella bronchiseptica* BS-ykwC 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 7440 *Bordetella bronchiseptica* EC-yihU 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC
 I_1_1_31)
 I_1_1_31 799 *Bacillus subtilis* yfjR 3-HYDROXYISOBUTYRATE DEHYDROGENASE (EC I_1_1_31)
 I_1_1_36 7197 *Vibrio cholerae* El Tor N16961ORFA00378 ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 3066 *Staphylococcus aureus* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 33 *Rickettsia prowazekii* RP035 ACETOACETYL-COA REDUCTASE (EC I_1_1_36)

I_1_1_36 1194 *Mycobacterium tuberculosis* Rv2073c ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 1414 *Mycobacterium tuberculosis* Rv3791 ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 700 *Mycobacterium leprae* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 2063 *Mycobacterium leprae* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 284 *Mycobacterium bovis* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 6869 *Klebsiella pneumoniae* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 956 *Corynebacterium diphtheriae* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 1520 *Corynebacterium diphtheriae* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 1637 *Bordetella pertussis* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 3963 *Bordetella pertussis* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 7078 *Bordetella bronchiseptica* ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_36 9568 *Bordetella bronchiseptica* BS-yvaG ACETOACETYL-COA REDUCTASE (EC I_1_1_36)
 I_1_1_38 4354 *Yersinia pestis* PUTATIVE MALATE OXIDOREDUCTASE (EC I_1_1_38)
 I_1_1_38 4355 *Yersinia pestis* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 5014 *Vibrio cholerae* El Tor N16961 ORF01542 NAD-DEPENDENT MALIC ENZYME (EC I_1_1_38)
 I_1_1_38 41 *Streptococcus pyogenes* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 3296 *Staphylococcus aureus* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 2094 *Salmonella typhimurium* maeA MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1074 *Salmonella paratyphi* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1181 *Salmonella paratyphi* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1182 *Salmonella paratyphi* PUTATIVE MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1183 *Salmonella paratyphi* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 805 *Salmonella enteritidis* NAD-DEPENDENT MALIC ENZYME (EC I_1_1_38)
 I_1_1_38 2806 *Salmonella enteritidis* NAD-DEPENDENT MALIC ENZYME (EC I_1_1_38)
 I_1_1_38 2026 *Salmonella dublin* NAD-DEPENDENT MALIC ENZYME (EC I_1_1_38)
 I_1_1_38 3234 *Saccharomyces cerevisiae* MAE1 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 366 *Rickettsia prowazekii* RP373 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 241 *Pseudomonas aeruginosa* PA3471 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1305 *Porphyromonas gingivalis* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1239 *Pasteurella multocida* mdh_1 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 636 *Neisseria gonorrhoeae* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 65 *Mycobacterium leprae* PUTATIVE MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1199 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1200 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1201 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 8091 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 8092 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 8093 *Klebsiella pneumoniae* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 6231 *Haemophilus influenzae* H11245 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 624 *Haemophilus ducreyi* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 4930 *Escherichia coli* sfcA NAD-DEPENDENT MALIC ENZYME (EC I_1_1_38)
 I_1_1_38 1020 *Enterococcus faecalis* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1680 *Enterococcus faecalis* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1232 *Clostridium difficile* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 3605 *Clostridium acetobutylicum* 5079702_F1_2 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 3724 *Clostridium acetobutylicum* 22938813_C3_6 MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 2660 *Campylobacter jejuni* Cj1287c MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 233 *Bordetella pertussis* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1159 *Bordetella pertussis* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 1517 *Bordetella pertussis* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 7334 *Bordetella bronchiseptica* MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 7867 *Bordetella bronchiseptica* BS-ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 2351 *Bacillus subtilis* yqkJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_38 2916 *Bacillus subtilis* ytsJ MALATE OXIDOREDUCTASE (NAD) (EC I_1_1_38)
 I_1_1_4 6406 *Yersinia pseudotuberculosis* 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_4 4926 *Yersinia pestis* 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_4 4333 *Saccharomyces cerevisiae* YAL061W 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_4 4334 *Saccharomyces cerevisiae* YAL060W 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_4 6853 *Pseudomonas aeruginosa* PA4097 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_4 1072 *Neisseria gonorrhoeae* BS-ydJL 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)

1_1_1_4 3777 *Mycobacterium bovis* BS-ydJL 2,3-BUTANEDIOL DEHYDROGENASE (EC 1_1_1_4)
 1_1_1_4 1531 *Corynebacterium diphtheriae* 2,3-BUTANEDIOL DEHYDROGENASE (EC 1_1_1_4)
 1_1_1_4 624 *Bacillus subtilis* ydJL 2,3-BUTANEDIOL DEHYDROGENASE (EC 1_1_1_4)
 1_1_1_5 1649 *Streptococcus pyogenes* ACETOIN(DIACETYL) REDUCTASE (EC 1_1_1_5)
 1_1_1_5 1801 *Streptococcus mutans* EC-srID ACETOIN(DIACETYL) REDUCTASE (EC 1_1_1_5)
 1_1_1_5 875 *Staphylococcus aureus* EC-srID ACETOIN(DIACETYL) REDUCTASE (EC 1_1_1_5)
 1_1_1_5 127 *Klebsiella pneumoniae* ACETOIN(DIACETYL) REDUCTASE (EC 1_1_1_5)
 1_1_1_56 3415 *Klebsiella pneumoniae* RIBITOL 2-DEHYDROGENASE (EC 1_1_1_56)
 1_1_1_56 117 *Clostridium acetobutylicum* 23600937_C3_164 RIBITOL 2-DEHYDROGENASE (EC 1_1_1_56)
 1_1_1_57 6851 *Yersinia pseudotuberculosis* EC-yeiQ D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 792 *Yersinia pestis* EC-yeiQ D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 2522 *Salmonella typhimurium* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 6662 *Salmonella typhimurium* uxB D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 549 *Salmonella typhi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 3394 *Salmonella typhi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 3237 *Salmonella paratyphi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 5503 *Salmonella paratyphi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 5504 *Salmonella paratyphi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 5505 *Salmonella paratyphi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 5506 *Salmonella paratyphi* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 1935 *Salmonella enteritidis* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 3247 *Salmonella enteritidis* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 1225 *Klebsiella pneumoniae* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 3842 *Klebsiella pneumoniae* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 7596 *Klebsiella pneumoniae* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 7597 *Klebsiella pneumoniae* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 7598 *Klebsiella pneumoniae* D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 2121 *Escherichia coli* yeiQ D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 4206 *Escherichia coli* uxB D-MANNONATE OXIDOREDUCTASE (EC 1_1_1_57)
 1_1_1_57 2082 *Clostridium acetobutylicum* 13912713_F2_11 FRUCTURONATE REDUCTASE (EC 1_1_1_57)
 1_1_1_58 7696 *Yersinia pseudotuberculosis* EC-uxaB ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 3854 *Yersinia pestis* EC-uxaB ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 3791 *Klebsiella pneumoniae* ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 3793 *Klebsiella pneumoniae* ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 4964 *Escherichia coli* uxB ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 1911 *Enterococcus faecium* (DOE) EC-uxaB ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 1012 *Clostridium acetobutylicum* 12401675_F3_23 ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 1100 *Clostridium acetobutylicum* 32236432_C1_51 ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_58 1239 *Bacillus subtilis* yjml ALTRONATE OXIDOREDUCTASE (EC 1_1_1_58)
 1_1_1_6 6412 *Yersinia pseudotuberculosis* EC-gldA GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 5146 *Yersinia pestis* EC-ybdH GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 714 *Streptococcus pyogenes* gldA GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 225 *Streptococcus pneumoniae* EC-gldA GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 465 *Streptococcus mutans* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 900 *Streptococcus mutans* EC-gldA GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 1397 *Streptococcus equi* EC-gldA GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 2679 *Salmonella typhimurium* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 3240 *Salmonella typhimurium* ybdH GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 3845 *Salmonella typhi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 5448 *Salmonella typhi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 274 *Salmonella paratyphi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 275 *Salmonella paratyphi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 2586 *Salmonella paratyphi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 2587 *Salmonella paratyphi* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 1694 *Salmonella enteritidis* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 2816 *Salmonella enteritidis* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 2990 *Salmonella enteritidis* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 1523 *Salmonella dublin* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 1136 *Klebsiella pneumoniae* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)
 1_1_1_6 3668 *Klebsiella pneumoniae* GLYCEROL DEHYDROGENASE (EC 1_1_1_6)

I_1_1_6 7486 *Klebsiella pneumoniae* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 7552 *Klebsiella pneumoniae* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 7553 *Klebsiella pneumoniae* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 4538 *Escherichia coli* ybdH GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 6262 *Escherichia coli* gldA GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 367 *Enterococcus faecium* (DOE) GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 3523 *Enterococcus faecium* (DOE) GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 478 *Enterococcus faecalis* EC-gldA GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 825 *Enterococcus faecalis* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 2341 *Enterococcus faecalis* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 1719 *Corynebacterium diphtheriae* GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 1735 *Clostridium acetobutylicum* 16594012_C1_43 GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_6 2870 *Bacillus subtilis* araM GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_60 4592 *Salmonella typhimurium* yhaE 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 6605 *Salmonella typhimurium* glxR 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 1396 *Salmonella typhi* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 1543 *Salmonella typhi* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 5609 *Salmonella paratyphi* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 5790 *Salmonella paratyphi* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 3003 *Salmonella enteritidis* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 4298 *Salmonella enteritidis* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 5340 *Salmonella enteritidis* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 2428 *Salmonella dublin* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 4457 *Salmonella dublin* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 3146 *Pseudomonas aeruginosa* PA1500 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 331 *Pasteurella multocida* D-BETA-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_30) / THREONINE 3-DEHYDROGENASE (EC I_1_1_103) / 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 3080 *Klebsiella pneumoniae* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 2151 *Haemophilus influenzae* HI1010 D-BETA-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_30) / THREONINE 3-DEHYDROGENASE (EC I_1_1_103) / 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 492 *Escherichia coli* b0509 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 5840 *Escherichia coli* yhaE 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 3509 *Clostridium difficile* EC-yhaE 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 5591 *Bordetella bronchiseptica* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 9497 *Bordetella bronchiseptica* 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_60 1397 *Bacillus subtilis* ykwC 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_61 6596 *Yersinia pseudotuberculosis* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 2160 *Yersinia pestis* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 3731 *Salmonella typhimurium* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 3720 *Salmonella typhi* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 3827 *Salmonella paratyphi* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 4943 *Salmonella enteritidis* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 3823 *Salmonella dublin* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 698 *Pseudomonas aeruginosa* PA5186 NAD-DEPENDENT 4-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_61)
 I_1_1_61 1718 *Pseudomonas aeruginosa* PA1146 NAD-DEPENDENT 4-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_61)
 I_1_1_61 463 *Porphyromonas gingivalis* NAD-DEPENDENT 4-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_61)
 I_1_1_61 337 *Pasteurella multocida* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 5751 *Haemophilus influenzae* HI1014 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_61 2687 *Clostridium difficile* NAD-DEPENDENT 4-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_61)
 I_1_1_61 2155 *Clostridium acetobutylicum* 20589675_C1_26 NAD-DEPENDENT 4-HYDROXYBUTYRATE DEHYDROGENASE (EC I_1_1_61)

I_1_1_61 2154 *Bordetella pertussis* EC-yiaY NAD-DEPENDENT 4-HYDROXYBUTYRATE
 DEHYDROGENASE (EC I_1_1_61)
 I_1_1_61 6139 *Bordetella bronchiseptica* EC-yiaY NAD-DEPENDENT 4-HYDROXYBUTYRATE
 DEHYDROGENASE (EC I_1_1_61)
 I_1_1_67 6339 *Saccharomyces cerevisiae* YEL070W MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_67 7659 *Saccharomyces cerevisiae* YNR073C MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_67 1602 *Pseudomonas aeruginosa* mtlD MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_67 4974 *Escherichia coli* b1542 MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_67 3136 *Enterococcus faecium* (DOE) MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_69 6602 *Yersinia pseudotuberculosis* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 2595 *Yersinia pestis* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 442 *Streptococcus pyogenes* idnO GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 727 *Streptococcus pneumoniae* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 1100 *Streptococcus equi* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 2040 *Salmonella paratyphi* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 4369 *Salmonella enteritidis* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 2616 *Pseudomonas aeruginosa* rhIG GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 1375 *Mycobacterium tuberculosis* Rv1928c GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 3583 *Mycobacterium tuberculosis* Rv1714 GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 125 *Mycobacterium bovis* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 3932 *Mycobacterium bovis* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 6405 *Escherichia coli* yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 2267 *Enterococcus faecium* (DOE) GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 396 *Enterococcus faecalis* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 1303 *Enterococcus faecalis* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 2894 *Bordetella pertussis* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 6825 *Bordetella bronchiseptica* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_69 8848 *Bordetella bronchiseptica* GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_77 7794 *Yersinia pseudotuberculosis* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 413 *Yersinia pestis* BS-gbsB LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 5532 *Salmonella typhimurium* fucO LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 3850 *Salmonella typhi* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 5994 *Salmonella paratyphi* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 5995 *Salmonella paratyphi* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 4651 *Salmonella enteritidis* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 4045 *Klebsiella pneumoniae* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 4046 *Klebsiella pneumoniae* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 4047 *Klebsiella pneumoniae* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 7261 *Klebsiella pneumoniae* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 5666 *Escherichia coli* fucO LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_77 3544 *Enterococcus faecium* (DOE) EC-fucO LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_81 6706 *Yersinia pseudotuberculosis* hydroxypyruvate reductase (EC I_1_1_81)
 I_1_1_81 2591 *Yersinia pestis* hydroxypyruvate reductase (EC I_1_1_81)
 I_1_1_82 2225 *Salmonella typhimurium* yiaK MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 2564 *Salmonella typhi* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 4528 *Salmonella paratyphi* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 2694 *Salmonella enteritidis* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1594 *Salmonella dublin* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 4569 *Pseudomonas aeruginosa* PA1252 MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 900 *Pasteurella multocida* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 19683 *Haemophilus influenzae* HI1031 MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 3495 *Escherichia coli* b3575 MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1552 *Enterococcus faecalis* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1760 *Enterococcus faecalis* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 2427 *Clostridium acetobutylicum* 197142_C2_31 MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1618 *Bordetella pertussis* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1619 *Bordetella pertussis* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 1731 *Bordetella pertussis* BS-yjmC MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_82 5266 *Bordetella bronchiseptica* MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_85 5094 *Yersinia pseudotuberculosis* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 4730 *Yersinia pestis* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)

I_1_1_85 6248 *Vibrio cholerae* El Tor N16961 ORF03147 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 356 *Streptococcus pneumoniae* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 357 *Streptococcus pneumoniae* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 1051 *Streptococcus mutans* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 3698 *Staphylococcus aureus* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 179 *Salmonella typhimurium* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 996 *Salmonella typhi* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 3570 *Salmonella paratyphi* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 559 *Salmonella enteritidis* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 2961 *Salmonella dublin* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 122 *Saccharomyces cerevisiae* LEU2 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 2259 *Pseudomonas aeruginosa* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 1212 *Pasteurella multocida* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 28 *Neurospora crassa* leu-1 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 1826 *Neisseria gonorrhoeae* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 3328 *Mycobacterium tuberculosis* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 2402 *Mycobacterium leprae* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 4246 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 4247 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 23 *Helicobacter pylori* J99 icd 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 9360 *Haemophilus influenzae* HI0987 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 4320 *Escherichia coli* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 1944 *Corynebacterium diphtheriae* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 547 *Clostridium difficile* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 2234 *Clostridium acetobutylicum* 892175_C2_27 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 1069 *Campylobacter jejuni* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 519 *Bordetella pertussis* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 7338 *Bordetella bronchiseptica* EC-leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 8332 *Bordetella bronchiseptica* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 401 *Bacillus subtilis* ycsA 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_85 2821 *Bacillus subtilis* leuB 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_86 5524 *Yersinia pseudotuberculosis* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 2922 *Yersinia pestis* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 4045 *Vibrio cholerae* El Tor N16961 ORF00231 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 672 *Streptococcus pneumoniae* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 668 *Streptococcus mutans* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 2410 *Staphylococcus aureus* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 2296 *Salmonella typhimurium* ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1391 *Salmonella typhi* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 5580 *Salmonella paratyphi* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 5581 *Salmonella paratyphi* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1158 *Salmonella enteritidis* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 4523 *Salmonella dublin* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 3233 *Saccharomyces cerevisiae* ILV5 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 3441 *Pseudomonas aeruginosa* ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1918 *Pasteurella multocida* ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 177 *Neurospora crassa* ilv2 KETOL-ACID REDUCTOISOMERASE PRECURSOR (EC I_1_1_86)
 I_1_1_86 20571 *Neurospora crassa* KETOL-ACID REDUCTOISOMERASE PRECURSOR (EC I_1_1_86)
 I_1_1_86 654 *Neisseria gonorrhoeae* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 3594 *Mycobacterium tuberculosis* ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 2100 *Mycobacterium leprae* spJ033114 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 2993 *Mycobacterium bovis* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 4033 *Klebsiella pneumoniae* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 4034 *Klebsiella pneumoniae* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1276 *Helicobacter pylori* HP0330 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 318 *Helicobacter pylori* J99trJQ9ZMA9 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1488 *Haemophilus influenzae* HI0682 KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 3686 *Escherichia coli* ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_86 1949 *Corynebacterium diphtheriae* KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)

1_1_1_86 1132 *Clostridium difficile* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_86 448 *Clostridium acetobutylicum* 6557_C3_87 KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_86 6 *Campylobacter jejuni* ilvC KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_86 3074 *Bordetella pertussis* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_86 8804 *Bordetella bronchiseptica* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_86 2823 *Bacillus subtilis* ilvC KETOL-ACID REDUCTOISOMERASE (EC 1_1_1_86)
 1_1_1_88 1236 *Streptococcus pyogenes* mvaS_1 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 923 *Streptococcus pneumoniae* 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 551 *Streptococcus mutans* 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 1071 *Streptococcus equi* 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 3426 *Staphylococcus aureus* 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 1963 *Enterococcus faecium* (DOE) ACETYL-COA ACETYLTRANSFERASE (EC 2_3_1_9) / 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 484 *Enterococcus faecalis* BS-mmGA ACETYL-COA ACETYLTRANSFERASE (EC 2_3_1_9) / 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_88 76 *Borrelia burgdorferi* BB0685 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC 1_1_1_88)
 1_1_1_9 7941 *Saccharomyces cerevisiae* YLR070C D-XYLULOSE REDUCTASE (EC 1_1_1_9)
 1_1_1_90 8244 *Klebsiella pneumoniae* ARYL-ALCOHOL DEHYDROGENASE (EC 1_1_1_90)
 1_1_1_90 8245 *Klebsiella pneumoniae* ARYL-ALCOHOL DEHYDROGENASE (EC 1_1_1_90)
 1_1_1_91 5043 *Salmonella paratyphi* ARYL-ALCOHOL DEHYDROGENASE (NADP+) (EC 1_1_1_91)
 1_1_1_91 724 *Saccharomyces cerevisiae* AAD10 ARYL-ALCOHOL DEHYDROGENASE (NADP+) (EC 1_1_1_91)
 1_1_1_91 6162 *Saccharomyces cerevisiae* AAD14 ARYL-ALCOHOL DEHYDROGENASE (NADP+) (EC 1_1_1_91)
 1_1_1_91 8518 *Saccharomyces cerevisiae* AAD4 ARYL-ALCOHOL DEHYDROGENASE (NADP+) (EC 1_1_1_91)
 1_1_1_93 6131 *Yersinia pseudotuberculosis* BS-ycsA PROBABLE TARTRATE DEHYDROGENASE (EC 1_1_1_93)
 1_1_1_93 698 *Yersinia pestis* BS-ycsA tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 1773 *Saccharomyces cerevisiae* LYS12 tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 1556 *Klebsiella pneumoniae* tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 1557 *Klebsiella pneumoniae* tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 1558 *Klebsiella pneumoniae* tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 1757 *Escherichia coli* b1800 tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 2021 *Bordetella pertussis* BS-ycsA tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 5469 *Bordetella bronchiseptica* tartrate dehydrogenase (EC 1_1_1_93)
 1_1_1_93 9062 *Bordetella bronchiseptica* BS-ycsA PROBABLE TARTRATE DEHYDROGENASE (EC 1_1_1_93)
 1_1_1_94 271 *Yersinia pestis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 524 *Ureaplasma urealyticum* UU382 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 768 *Treponema pallidum* TP1009 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 598 *Streptococcus pyogenes* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 1286 *Streptococcus pneumoniae* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 1523 *Streptococcus mutans* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 733 *Streptococcus equi* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 1200 *Staphylococcus aureus* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 1_1_1_94 5944 *Salmonella typhimurium* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)

I_1_1_94 5514 *Salmonella typhi* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 4177 *Salmonella paratyphi* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 4178 *Salmonella paratyphi* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 3702 *Salmonella dublin* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 433 *Rickettsia prowazekii* RP442 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 8121 *Pseudomonas aeruginosa* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 257 *Porphyromonas gingivalis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 118 *Pasteurella multocida* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 496 *Neisseria gonorrhoeae* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 5523 *Mycobacterium tuberculosis* gpdA1 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 5954 *Mycobacterium tuberculosis* gpdA2 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2284 *Mycobacterium leprae* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 426 *Mycobacterium bovis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 1533 *Mycobacterium bovis* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 1534 *Mycobacterium bovis* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2577 *Klebsiella pneumoniae* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2578 *Klebsiella pneumoniae* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 374 *Helicobacter pylori* HP0961 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 892 *Helicobacter pylori* J99trfQ9ZKP0 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 8594 *Haemophilus influenzae* HI0605 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 1508 *Haemophilus ducreyi* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 6098 *Escherichia coli* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 852 *Enterococcus faecium* (DOE) GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2898 *Enterococcus faecalis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 1927 *Corynebacterium diphtheriae* GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 705 *Clostridium difficile* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2392 *Clostridium acetobutylicum* 24881260_C2_27 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 683 *Chlamydia trachomatis* D/UW-3/Cx EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 1014 *Chlamydia pneumoniae* AR39 CP1014 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 787 *Chlamydia pneumoniae* CWL029 EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 2503 *Campylobacter jejuni* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)
 I_1_1_94 381 *Borrelia burgdorferi* BB0368 GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC 1_1_1_94)

I_1_1_94 2044 *Bordetella pertussis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC I_1_1_94)
 I_1_1_94 2279 *Bacillus subtilis* gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC I_1_1_94)
 I_1_2_3 5868 *Yersinia pseudotuberculosis* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 1314 *Yersinia pestis* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 7484 *Vibrio cholerae* El Tor N16961ORFA00736 L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 5219 *Salmonella typhimurium* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 5949 *Salmonella typhimurium* lctD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 547 *Salmonella typhi* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2060 *Salmonella typhi* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 366 *Salmonella paratyphi* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2021 *Salmonella paratyphi* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2126 *Salmonella enteritidis* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 4658 *Salmonella dublin* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 3063 *Saccharomyces cerevisiae* CYB2 CYTOCHROME B2 PRECURSOR (EC I_1_2_3)
 I_1_2_3 1256 *Pseudomonas aeruginosa* lldA L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2040 *Pseudomonas aeruginosa* lldD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 1334 *Pasteurella multocida* lldD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 48 *Neisseria gonorrhoeae* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 4088 *Mycobacterium tuberculosis* lldD2 L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2712 *Mycobacterium leprae* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 617 *Mycobacterium bovis* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2573 *Klebsiella pneumoniae* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 18238 *Haemophilus influenzae* sp|P46454 L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 1302 *Haemophilus ducreyi* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 3525 *Escherichia coli* lctD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 631 *Enterococcus faecium* (DOE) L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 2880 *Bordetella pertussis* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 4007 *Bordetella pertussis* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 4452 *Bordetella pertussis* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 7568 *Bordetella bronchiseptica* L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_3 9132 *Bordetella bronchiseptica* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_4 7485 *Vibrio cholerae* El Tor N16961ORFA00737 D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 3339 *Saccharomyces cerevisiae* DLD1 D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)
 I_1_2_4 6088 *Saccharomyces cerevisiae* DLD3 PROBABLE D-LACTATE DEHYDROGENASE [CYTOCHROME] (EC I_1_2_4)
 I_1_2_4 4407 *Pseudomonas aeruginosa* PA3026 D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)
 I_1_2_4 5243 *Pseudomonas aeruginosa* PA4772 D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 3920 *Mycobacterium tuberculosis* Rv2251 D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)
 I_1_2_4 7972 *Klebsiella pneumoniae* D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)
 I_1_2_4 618 *Helicobacter pylori* HP1222 D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 1133 *Helicobacter pylori* J99 dld D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 5648 *Escherichia coli* b2773 D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 1345 *Clostridium difficile* EC-glcD D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)

I_1_2_4 1765 *Clostridium acetobutylicum* 33214008_C2_41 D-LACTATE DEHYDROGENASE (CYTOCHROME) PRECURSOR (EC I_1_2_4)
 I_1_2_4 874 *Campylobacter jejuni* Cj1585c D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 3396 *Bordetella pertussis* D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 6970 *Bordetella bronchiseptica* D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_2_4 2862 *Bacillus subtilis* ysfC D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_3_24 5908 *Saccharomyces cerevisiae* ALO1 L-GALACTONOLACTONE OXIDASE (EC I_1_3_24) / D-ARABINONO-1,4-LACTONE OXIDASE (EC I_1_3_37)
 I_1_3_37 5908 *Saccharomyces cerevisiae* ALO1 L-GALACTONOLACTONE OXIDASE (EC I_1_3_24) / D-ARABINONO-1,4-LACTONE OXIDASE (EC I_1_3_37)
 I_1_3_6 1934 *Mycobacterium tuberculosis* choD CHOLESTEROL OXIDASE PRECURSOR (EC I_1_3_6)
 I_1_3_6 1224 *Mycobacterium leprae*trQ59530 CHOLESTEROL OXIDASE PRECURSOR (EC I_1_3_6)
 I_1_3_6 3794 *Mycobacterium bovis* CHOLESTEROL OXIDASE PRECURSOR (EC I_1_3_6)
 I_1_3_6 3795 *Mycobacterium bovis* CHOLESTEROL OXIDASE PRECURSOR (EC I_1_3_6)
 I_1_3_8 3056 *Mycobacterium tuberculosis* Rv3790 L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_8 701 *Mycobacterium leprae* L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_8 3240 *Mycobacterium leprae* L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_8 283 *Mycobacterium bovis* L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_8 957 *Corynebacterium diphtheriae* L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_8 1118 *Bacillus subtilis* yitY L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_9 4256 *Clostridium acetobutylicum* GALACTOSE OXIDASE PRECURSOR (EC I_1_3_9)
 I_1_99_10 20148 *Neurospora crassa* GLUCOSE DEHYDROGENASE (ACCEPTOR) PRECURSOR (EC I_1_99_10)
 I_1_99_10 1284 *Mycobacterium tuberculosis* Rv1279 GLUCOSE DEHYDROGENASE (ACCEPTOR) (EC I_1_99_10)
 I_1_99_16 1142 *Staphylococcus aureus* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 2892 *Staphylococcus aureus* EC-yojH MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 4488 *Pseudomonas aeruginosa* mqoB MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 7524 *Pseudomonas aeruginosa* mqoA MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 2176 *Neisseria gonorrhoeae* EC-yojH MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 1834 *Mycobacterium tuberculosis* Rv2852c MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 1135 *Mycobacterium bovis* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 1240 *Mycobacterium bovis* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 3068 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 3069 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 3492 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 3493 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 9090 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 9091 *Klebsiella pneumoniae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 1355 *Haemophilus ducreyi* EC-yojH MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 5342 *Escherichia coli* yojH MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_16 2219 *Corynebacterium diphtheriae* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_17 3487 *Salmonella typhimurium* yliI GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC I_1_99_17)
 I_1_99_17 4426 *Salmonella typhimurium* gcd GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC I_1_99_17)
 I_1_99_17 668 *Salmonella typhi* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC I_1_99_17)
 I_1_99_17 993 *Salmonella typhi* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC I_1_99_17)
 I_1_99_17 395 *Salmonella paratyphi* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC I_1_99_17)
 I_1_99_17 396 *Salmonella paratyphi* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC I_1_99_17)
 I_1_99_17 3182 *Salmonella paratyphi* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC I_1_99_17)
 I_1_99_17 3184 *Salmonella paratyphi* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC I_1_99_17)
 I_1_99_17 522 *Salmonella enteritidis* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC I_1_99_17)

I_1_99_17 1946 *Salmonella enteritidis* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 450 *Salmonella dublin* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 1468 *Salmonella dublin* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 1258 *Pseudomonas aeruginosa* PA1112 GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 6088 *Pseudomonas aeruginosa* gcd GLUCOSE DEHYDROGENASE-A [PYRROLOQUINOLINE-QUINONE] PRECURSOR (EC 1_1_99_17)
 I_1_99_17 4135 *Klebsiella pneumoniae* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 4136 *Klebsiella pneumoniae* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 4138 *Klebsiella pneumoniae* GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 8195 *Klebsiella pneumoniae* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 8196 *Klebsiella pneumoniae* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 804 *Escherichia coli* b0837 GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 4337 *Escherichia coli* gcd GLUCOSE DEHYDROGENASE (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 4788 *Escherichia coli* b1144 GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) (EC 1_1_99_17)
 I_1_99_17 3518 *Bordetella pertussis* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 3519 *Bordetella pertussis* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_17 4966 *Bordetella bronchiseptica* GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC 1_1_99_17)
 I_1_99_21 8182 *Pseudomonas aeruginosa* PA4571 sorbitol dehydrogenase, cytochrome c subunit (EC 1_1_99_21)
 I_1_99_25 6023 *Yersinia pseudotuberculosis* BS-yhfK quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 1496 *Yersinia pestis* Q56987 quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 7554 *Vibrio cholerae* El Tor N16961ORFA00828 quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 1081 *Streptococcus pneumoniae* BS-ywnB quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 930 *Staphylococcus aureus* BS-yhfK quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 5465 *Saccharomyces cerevisiae* YMR090W quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 8532 *Pseudomonas aeruginosa* PA0741 quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 2947 *Enterococcus faecium* (DOE) quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 4055 *Enterococcus faecium* (DOE) BS-yhfK quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 2339 *Enterococcus faecalis* BS-ywnB quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 2040 *Campylobacter jejuni* Cj1555c quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 1026 *Bacillus subtilis* yhfK quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_25 3657 *Bacillus subtilis* ywnB quinate dehydrogenase (pyrroloquinoline-quinone) (EC 1_1_99_25)
 I_1_99_28 3781 *Yersinia pestis* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC 1_1_99_28)
 I_1_99_28 979 *Streptococcus pneumoniae* EC-yjhc GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC 1_1_99_28)
 I_1_99_28 2014 *Staphylococcus aureus* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC 1_1_99_28)
 I_1_99_28 3769 *Staphylococcus aureus* BS-yrbE GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC 1_1_99_28)

I_1_99_28 2360 *Salmonella typhimurium* yjhc GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 5269 *Salmonella paratyphi* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 816 *Salmonella enteritidis* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 3620 *Salmonella dublin* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 795 *Pasteurella multocida* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 5501 *Klebsiella pneumoniae* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 1275 *Escherichia coli* b1315 GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 180 *Bordetella pertussis* EC-yjhc GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_28 78 *Bordetella bronchiseptica* EC-yjhc GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_3 2248 *Pseudomonas aeruginosa* PA2266 gluconate 2-dehydrogenase, cytochrome c subunit (EC I_1_99_3)
 I_1_99_3 2588 *Pseudomonas aeruginosa* PA2265 gluconate 2-dehydrogenase alpha chain precursor (EC I_1_99_3)
 I_1_99_3 2591 *Pseudomonas aeruginosa* PA2264 gluconate 2-dehydrogenase gamma chain precursor (EC I_1_99_3)
 I_1_99_3 2963 *Klebsiella pneumoniae* gluconate 2-dehydrogenase beta chain precursor (EC I_1_99_3)
 I_1_99_3 2964 *Klebsiella pneumoniae* gluconate 2-dehydrogenase beta chain precursor (EC I_1_99_3)
 I_1_99_3 2965 *Klebsiella pneumoniae* gluconate 2-dehydrogenase alpha chain precursor (EC I_1_99_3)
 I_1_99_3 2967 *Klebsiella pneumoniae* gluconate 2-dehydrogenase gamma chain precursor (EC I_1_99_3)
 I_1_99_3 2440 *Campylobacter jejuni* Cj0414 gluconate 2-dehydrogenase gamma chain precursor (EC I_1_99_3)
 I_1_99_3 2441 *Campylobacter jejuni* Cj0415 gluconate 2-dehydrogenase alpha chain precursor (EC I_1_99_3)
 I_1_99_3 8450 *Bordetella bronchiseptica* gluconate 2-dehydrogenase beta chain precursor (EC I_1_99_3)
 I_1_99_3 8903 *Bordetella bronchiseptica* gluconate 2-dehydrogenase gamma chain precursor (EC I_1_99_3)
 I_1_99_3 8904 *Bordetella bronchiseptica* gluconate 2-dehydrogenase alpha chain precursor (EC I_1_99_3)
 I_1_99_8 5086 *Pseudomonas aeruginosa* exaA ALCOHOL DEHYDROGENASE [ACCEPTOR] PRECURSOR (EC I_1_99_8)
 I_1_99_8 6922 *Klebsiella pneumoniae* METHANOL DEHYDROGENASE SUBUNIT I PRECURSOR (EC I_1_99_8)
 I_1_99_8 6923 *Klebsiella pneumoniae* METHANOL DEHYDROGENASE SUBUNIT I PRECURSOR (EC I_1_99_8)
 I_1_99_8 6924 *Klebsiella pneumoniae* METHANOL DEHYDROGENASE SUBUNIT I PRECURSOR (EC I_1_99_8)
 I_10_3_2 5230 *Yersinia pseudotuberculosis* EC-yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 1804 *Yersinia pestis* EC-yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4423 *Salmonella typhimurium* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4424 *Salmonella typhimurium* yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 992 *Salmonella typhi* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 3036 *Salmonella paratyphi* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 3038 *Salmonella paratyphi* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 3039 *Salmonella paratyphi* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 3748 *Salmonella enteritidis* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 3655 *Salmonella dublin* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 422 *Pasteurella multocida* EC-yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 179 *Neurospora crassa* AAA33590_1 LACCASE PRECURSOR (EC I_10_3_2)
 I_10_3_2 180 *Neurospora crassa* AAA33591_1 LACCASE PRECURSOR (EC I_10_3_2)
 I_10_3_2 181 *Neurospora crassa* AAA33592_1 LACCASE PRECURSOR (EC I_10_3_2)
 I_10_3_2 3025 *Mycobacterium tuberculosis* Rv0846c LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 941 *Mycobacterium bovis* EC-yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4130 *Klebsiella pneumoniae* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4131 *Klebsiella pneumoniae* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4132 *Klebsiella pneumoniae* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 4133 *Klebsiella pneumoniae* LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 123 *Escherichia coli* yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_3_2 1893 *Corynebacterium diphtheriae* LACCASE I PRECURSOR (EC I_10_3_2)

I_10_3_2 1983 *Campylobacter jejuni* Cj1516 LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_99_1 264 *Rickettsia prowazekii* RP270 CYTOCHROME B6-F COMPLEX IRON-SULFUR SUBUNIT (EC I_10_99_1)
 I_11_1_1 1506 *Streptococcus pyogenes* NADH PEROXIDASE (EC I_11_1_1)
 I_11_1_1 2817 *Enterococcus faecium* (DOE) NADH PEROXIDASE (EC I_11_1_1)
 I_11_1_1 1676 *Enterococcus faecalis* NADH PEROXIDASE (EC I_11_1_1)
 I_11_1_10 5676 *Salmonella typhimurium* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 1987 *Salmonella enteritidis* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 4704 *Salmonella dublin* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 6032 *Pseudomonas aeruginosa* cpo NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 3762 *Mycobacterium tuberculosis* hpx NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 4722 *Mycobacterium tuberculosis* Rv3312c NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 1949 *Mycobacterium bovis* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 3985 *Mycobacterium bovis* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 3986 *Mycobacterium bovis* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 5990 *Klebsiella pneumoniae* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 1545 *Clostridium difficile* BS-yisY NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 1045 *Clostridium acetobutylicum* 19696077_C3_52 NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_10 1090 *Bacillus subtilis* yisY NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_5 5289 *Yersinia pseudotuberculosis* EC-yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 2698 *Yersinia pestis* EC-yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 3973 *Vibrio cholerae* El Tor N16961 ORF00136 CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 5858 *Salmonella typhimurium* yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 911 *Salmonella typhi* CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 2571 *Salmonella paratyphi* CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 1073 *Salmonella enteritidis* CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 6529 *Saccharomyces cerevisiae* CCP1 CYTOCHROME C PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 1122 *Pseudomonas aeruginosa* ccpR CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 37 *Pasteurella multocida* EC-yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 888 *Neisseria gonorrhoeae* PROBABLE CYTOCHROME C PEROXIDASE (EC I_11_1_5)
 I_11_1_5 842 *Helicobacter pylori* HP1461 CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 1341 *Helicobacter pylori* J99tr|Q9ZJF8 CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 6054 *Escherichia coli* yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 2341 *Campylobacter jejuni* Cj0358 CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_11_1_5 2725 *Campylobacter jejuni* Cj0020c CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_12_1_2 12 *Clostridium difficile* NAD-REDUCING HYDROGENASE HOXS ALPHA SUBUNIT (EC I_12_1_2)
 I_12_99_1 1065 *Clostridium difficile* COENZYME F420 HYDROGENASE BETA SUBUNIT (EC I_12_99_1)
 I_12_99_3 65 *Helicobacter pylori* HP0631 QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN PRECURSOR (EC I_12_99_3)
 I_12_99_3 575 *Helicobacter pylori* J99tr|Q9ZLK5 QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN PRECURSOR (EC I_12_99_3)
 I_12_99_3 1345 *Clostridium acetobutylicum* 33401551_F3_23 QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN (EC I_12_99_3)
 I_12_99_3 647 *Campylobacter jejuni* hydA2 QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN PRECURSOR (EC I_12_99_3)
 I_12_99_3 2923 *Campylobacter jejuni* hydA QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN PRECURSOR (EC I_12_99_3)
 I_13_11_1 257 *Pseudomonas aeruginosa* catA CATECHOL 1,2-DIOXYGENASE (EC I_13_11_1)
 I_13_11_2 5927 *Pseudomonas aeruginosa* PA3503 METAPYROCATECHASE (EC I_13_11_2)
 I_13_11_2 685 *Klebsiella pneumoniae* METAPYROCATECHASE (EC I_13_11_2)
 I_13_11_3 387 *Rickettsia prowazekii* RP396 PROTOCATECHUATE 3,4-DIOXYGENASE BETA CHAIN (EC I_13_11_3)

I_13_11_3 6877 *Pseudomonas aeruginosa* pcaH PROTOCATECHUATE 3,4-DIOXYGENASE BETA CHAIN (EC I_13_11_3)
 I_13_11_3 6878 *Pseudomonas aeruginosa* pcaG PROTOCATECHUATE 3,4-DIOXYGENASE ALPHA CHAIN (EC I_13_11_3)
 I_13_11_3 6919 *Klebsiella pneumoniae* PROTOCATECHUATE 3,4-DIOXYGENASE BETA CHAIN (EC I_13_11_3)
 I_13_11_3 6920 *Klebsiella pneumoniae* PROTOCATECHUATE 3,4-DIOXYGENASE ALPHA CHAIN (EC I_13_11_3)
 I_13_11_4 3418 *Salmonella typhimurium* GENTISATE 1,2-DIOXYGENASE (EC I_13_11_4)
 I_13_11_4 436 *Salmonella typhi* GENTISATE 1,2-DIOXYGENASE (EC I_13_11_4)
 I_13_11_4 1960 *Salmonella paratyphi* GENTISATE 1,2-DIOXYGENASE (EC I_13_11_4)
 I_13_11_4 3462 *Salmonella enteritidis* GENTISATE 1,2-DIOXYGENASE (EC I_13_11_4)
 I_13_11_4 916 *Pseudomonas aeruginosa* gtdA GENTISATE 1,2-DIOXYGENASE (EC I_13_11_4)
 I_13_11_8 1438 *Klebsiella pneumoniae* PROTOCATECHUATE 4,5-DIOXYGENASE BETA CHAIN (EC I_13_11_8)
 I_13_11_8 1439 *Klebsiella pneumoniae* PROTOCATECHUATE 4,5-DIOXYGENASE BETA CHAIN (EC I_13_11_8)
 I_14_12_1 2526 *Pseudomonas aeruginosa* antA ANTHRANILATE DIOXYGENASE LARGE SUBUNIT (EC I_14_12_1)
 I_14_12_1 6488 *Pseudomonas aeruginosa* antB ANTHRANILATE DIOXYGENASE SMALL SUBUNIT (EC I_14_12_1)
 I_14_12_3 3775 *Mycobacterium tuberculosis* Rv3161c BENZENE 1,2-DIOXYGENASE ALPHA SUBUNIT (EC I_14_12_3)
 I_14_12_3 1958 *Mycobacterium bovis* BENZENE 1,2-DIOXYGENASE ALPHA SUBUNIT (EC I_14_12_3)
 I_14_13_1 3165 *Staphylococcus aureus* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 1957 *Salmonella paratyphi* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 2306 *Pseudomonas aeruginosa* PA4217 SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 7547 *Pseudomonas aeruginosa* PA2587 SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 4797 *Mycobacterium tuberculosis* Rv0575c SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 5663 *Mycobacterium tuberculosis* Rv1260 SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 3080 *Mycobacterium bovis* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 3081 *Mycobacterium bovis* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 3614 *Mycobacterium bovis* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 3886 *Klebsiella pneumoniae* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 3887 *Klebsiella pneumoniae* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 4410 *Bordetella pertussis* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 4411 *Bordetella pertussis* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 7955 *Bordetella bronchiseptica* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 8124 *Bordetella bronchiseptica* SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_1 723 *Bacillus subtilis* yetM SALICYLATE HYDROXYLASE (EC I_14_13_1)
 I_14_13_2 1552 *Pseudomonas aeruginosa* pobA P-HYDROXYBENZOATE HYDROXYLASE (EC I_14_13_2)
 I_14_13_2 4875 *Klebsiella pneumoniae* P-HYDROXYBENZOATE HYDROXYLASE (EC I_14_13_2)
 I_14_13_2 4876 *Klebsiella pneumoniae* P-HYDROXYBENZOATE HYDROXYLASE (EC I_14_13_2)
 I_14_13_3 4819 *Yersinia pseudotuberculosis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 5410 *Yersinia pseudotuberculosis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 1254 *Yersinia pestis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 1255 *Yersinia pestis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 4940 *Salmonella typhimurium* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 2180 *Salmonella typhi* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 5849 *Salmonella paratyphi* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 5850 *Salmonella paratyphi* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 4223 *Salmonella enteritidis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 3550 *Salmonella dublin* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 799 *Pseudomonas aeruginosa* hpaA 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC I_14_13_3)

I_14_13_3 922 *Pasteurella multocida* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 954 *Neisseria gonorrhoeae* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 4764 *Mycobacterium tuberculosis* Rv3007c 4-HYDROXYPHENYLACETATE 3-
 MONOOXYGENASE (EC I_14_13_3)
 I_14_13_3 2352 *Klebsiella pneumoniae* 4-hydroxyphenylacetate 3-monooxygenase (EC I_14_13_3)
 I_14_13_3 4948 *Klebsiella pneumoniae* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 4949 *Klebsiella pneumoniae* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 374 *Haemophilus ducreyi* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 4727 *Escherichia coli* b1007 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_3 1860 *Bacillus subtilis* yoaI 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE (EC
 I_14_13_3)
 I_14_13_7 3305 *Clostridium difficile* PHENOL HYDROXYLASE P5 PROTEIN (EC I_14_13_7)
 I_14_13_7 3759 *Bordetella pertussis* PHENOL HYDROXYLASE P5 PROTEIN (EC I_14_13_7)
 I_14_13_7 8286 *Bordetella bronchiseptica* PHENOL HYDROXYLASE P5 PROTEIN (EC I_14_13_7)
 I_14_14_3 7523 *Yersinia pseudotuberculosis* EC-yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 754 *Yersinia pestis* EC-yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 4913 *Yersinia pestis* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 1282 *Streptococcus pyogenes* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 238 *Streptococcus pneumoniae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1005 *Staphylococcus aureus* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1761 *Staphylococcus aureus* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 2335 *Staphylococcus aureus* BS-yddN ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 3252 *Salmonella typhimurium* yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 6246 *Salmonella typhimurium* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 3141 *Salmonella typhi* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 4093 *Salmonella typhi* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 51 *Salmonella paratyphi* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 52 *Salmonella paratyphi* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 348 *Salmonella paratyphi* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 3770 *Salmonella paratyphi* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1304 *Salmonella enteritidis* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 2903 *Salmonella enteritidis* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 1120 *Salmonella dublin* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 1573 *Salmonella dublin* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 2229 *Pseudomonas aeruginosa* PA2483 ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 7385 *Pseudomonas aeruginosa* PA5306 ALKANAL MONOOXYGENASE BETA CHAIN (EC
 I_14_14_3)
 I_14_14_3 7839 *Pseudomonas aeruginosa* PA1186 ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 1366 *Mycobacterium tuberculosis* Rv1936 ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 2968 *Mycobacterium tuberculosis* Rv3618 ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 4511 *Mycobacterium tuberculosis* Rv3520c ALKANAL MONOOXYGENASE ALPHA CHAIN (EC
 I_14_14_3)
 I_14_14_3 2832 *Mycobacterium leprae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1268 *Mycobacterium bovis* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1770 *Mycobacterium bovis* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 1146 *Klebsiella pneumoniae* ALKANAL MONOOXYGENASE BETA CHAIN (EC I_14_14_3)
 I_14_14_3 3937 *Klebsiella pneumoniae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 4344 *Klebsiella pneumoniae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)
 I_14_14_3 4345 *Klebsiella pneumoniae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC I_14_14_3)

I_14_14_3 4347 *Klebsiella pneumoniae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 1342 *Escherichia coli* b1382 ALKANAL MONOOXYGENASE BETA CHAIN (EC 1_14_14_3)
 I_14_14_3 3084 *Escherichia coli* yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 697 *Enterococcus faecium* (DOE) ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 738 *Enterococcus faecalis* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 4 *Corynebacterium diphtheriae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 1373 *Corynebacterium diphtheriae* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 6345 *Bordetella bronchiseptica* EC-yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 7800 *Bordetella bronchiseptica* ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 289 *Bacillus subtilis* yceB ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 504 *Bacillus subtilis* yddN ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 2927 *Bacillus subtilis* ymo ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 3393 *Bacillus subtilis* yvbT ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_14_3 3803 *Bacillus subtilis* ywcH ALKANAL MONOOXYGENASE ALPHA CHAIN (EC 1_14_14_3)
 I_14_99_6 2999 *Mycobacterium tuberculosis* desA1 ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_14_99_6 4259 *Mycobacterium tuberculosis* desA2 ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_14_99_6 1516 *Mycobacterium leprae*tr|Q50050 ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_14_99_6 2009 *Mycobacterium leprae*tr|Q9X793 ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_14_99_6 1889 *Mycobacterium bovis* ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_14_99_6 2441 *Mycobacterium bovis* ACYL-[ACYL-CARRIER PROTEIN] DESATURASE PRECURSOR (EC 1_14_99_6)
 I_16_1_1 480 *Streptococcus pneumoniae* EC-ykgC MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 1949 *Salmonella typhimurium* ykgC MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 2126 *Salmonella typhi* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 3617 *Salmonella typhi* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 4008 *Salmonella typhi* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 1894 *Salmonella paratyphi* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 3425 *Salmonella enteritidis* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 4549 *Salmonella dublin* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 5581 *Mycobacterium tuberculosis* lpdB MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 3743 *Mycobacterium bovis* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 8520 *Klebsiella pneumoniae* MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 4421 *Escherichia coli* ykgC MERCURIC REDUCTASE (EC 1_16_1_1)
 I_16_1_1 13836 *Enterococcus faecium* (DOE) EC-ykgC MERCURIC REDUCTASE (EC 1_16_1_1)
 I_2_1_10 5050 *Yersinia pestis* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 5828 *Vibrio cholerae* El Tor N16961 ORF02567 ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 1475 *Streptococcus pyogenes* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 1237 *Streptococcus pneumoniae* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 161 *Streptococcus mutans* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 764 *Streptococcus equi* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 1750 *Staphylococcus aureus* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 I_2_1_10 1858 *Salmonella typhimurium* ana ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE

1_2_1_10 301 *Salmonella typhi* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 659 *Salmonella paratyphi* ALDEHYDE-ALCOHOL DEHYDROGENASE [INCLUDES: ALCOHOL DEHYDROGENASE (EC 1_1_1_1) (ADH) ; ACETALDEHYDE DEHYDROGENASE [ACETYLATED] (EC 1_2_1_10) (ACDH) ; PYRUVATE-FORMATE-LYASE DEACTIVASE (PFL DEACTIVASE)]
 1_2_1_10 660 *Salmonella paratyphi* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 3754 *Salmonella enteritidis* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 1361 *Salmonella dublin* ALDEHYDE-ALCOHOL DEHYDROGENASE [INCLUDES: ALCOHOL DEHYDROGENASE (EC 1_1_1_1) (ADH) ; ACETALDEHYDE DEHYDROGENASE [ACETYLATED] (EC 1_2_1_10) (ACDH) ; PYRUVATE-FORMATE-LYASE DEACTIVASE (PFL DEACTIVASE)]
 1_2_1_10 2008 *Pasteurella multocida* adh2 ALCOHOL DEHYDROGENASE 2 (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 1016 *Mycobacterium tuberculosis* Rv3535c ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 554 *Mycobacterium bovis* ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 687 *Klebsiella pneumoniae* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 1719 *Klebsiella pneumoniae* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 1967 *Klebsiella pneumoniae* ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 1968 *Klebsiella pneumoniae* ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 335 *Escherichia coli* mhpE ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 4830 *Escherichia coli* adhE ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 3540 *Enterococcus faecium* (DOE) ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 1414 *Enterococcus faecalis* ALCOHOL DEHYDROGENASE 2 (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 2929 *Enterococcus faecalis* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 2959 *Enterococcus faecalis* ALCOHOL DEHYDROGENASE 2 (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 103 *Clostridium difficile* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 669 *Clostridium difficile* ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 2075 *Clostridium difficile* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 2086 *Clostridium difficile* ALCOHOL DEHYDROGENASE 2 (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (EC 1_2_1_10)
 1_2_1_10 409 *Clostridium acetobutylicum* 13726577_C1_68 ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 671 *Clostridium acetobutylicum* 24098812_F1_7 ALCOHOL DEHYDROGENASE (EC 1_1_1_1) / ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10) / PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_10 3099 *Bacillus subtilis* gbsB ACETALDEHYDE DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10)
 1_2_1_11 4156 *Yersinia pseudotuberculosis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 6981 *Yersinia pseudotuberculosis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 724 *Yersinia pestis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1584 *Yersinia pestis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 734 *Vibrio cholerae* El Tor N16961 ORF02795 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 735 *Vibrio cholerae* El Tor N16961 ORF03067 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)

1_2_1_11 742 *Vibrio cholerae* El Tor N16961 ORF00373 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 743 *Vibrio cholerae* El Tor N16961 ORF01229 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 744 *Vibrio cholerae* El Tor N16961 ORF01217 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 5831 *Vibrio cholerae* El Tor N16961 ORF02571 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 5900 *Vibrio cholerae* El Tor N16961 ORF02658 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1355 *Streptococcus pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1764 *Streptococcus mutans* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1397 *Staphylococcus aureus* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 13 *Salmonella typhimurium* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1297 *Salmonella typhimurium* usg ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 605 *Salmonella typhi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1397 *Salmonella typhi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 2048 *Salmonella paratyphi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 2050 *Salmonella paratyphi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 2051 *Salmonella paratyphi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 4111 *Salmonella paratyphi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 4317 *Salmonella enteritidis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 3969 *Salmonella dublin* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 392 *Saccharomyces cerevisiae* HOM2 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 310 *Rickettsia prowazekii* RP316 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 291 *Pseudomonas aeruginosa* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1566 *Pseudomonas aeruginosa* PA3116 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1141 *Porphyromonas gingivalis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 694 *Pasteurella multocida* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1498 *Pasteurella multocida* usgl ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1823 *Neisseria gonorrhoeae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 4369 *Mycobacterium tuberculosis* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1366 *Mycobacterium leprae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1775 *Mycobacterium leprae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 72 *Mycobacterium bovis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1958 *Klebsiella pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1959 *Klebsiella pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1960 *Klebsiella pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 4661 *Klebsiella pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 8144 *Klebsiella pneumoniae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 588 *Helicobacter pylori* HP1189 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1104 *Helicobacter pylori* J99 asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 11538 *Haemophilus influenzae* HI1433 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 13276 *Haemophilus influenzae* HI0646 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 262 *Haemophilus ducreyi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 828 *Haemophilus ducreyi* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 5413 *Escherichia coli* usg ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 6010 *Escherichia coli* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 1_2_1_11 1807 *Enterococcus faecium* (DOE) ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)

I_2_1_11 2023 *Enterococcus faecalis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 271 *Corynebacterium diphtheriae* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 1033 *Clostridium difficile* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 855 *Clostridium acetobutylicum* 34110200_F1_1 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 2425 *Clostridium acetobutylicum* 24407827_F3_21 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 345 *Chlamydia trachomatis* D/UW-3/Cx asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 804 *Chlamydia pneumoniae* AR39 CP0804 ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 970 *Chlamydia pneumoniae* CWL029 asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 1755 *Campylobacter jejuni* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 520 *Bordetella pertussis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 7339 *Bordetella bronchiseptica* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_11 1675 *Bacillus subtilis* asd ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC 1_2_1_11)
 I_2_1_2 6935 *Yersinia pseudotuberculosis* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 7508 *Yersinia pseudotuberculosis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 7509 *Yersinia pseudotuberculosis* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 144 *Yersinia pestis* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 608 *Yersinia pestis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 3417 *Yersinia pestis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 4465 *Yersinia pestis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 4466 *Yersinia pestis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 4594 *Yersinia pestis* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 7683 *Vibrio cholerae* El Tor N16961 FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 1515 *Staphylococcus aureus* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 1546 *Staphylococcus aureus* FORMATE DEHYDROGENASE (EC 1_2_1_2)
 I_2_1_2 2476 *Salmonella typhimurium* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 3477 *Salmonella typhimurium* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 4494 *Salmonella typhimurium* FORMATE DEHYDROGENASE LARGE SUBUNIT PRECURSOR (EC 1_2_1_2)
 I_2_1_2 4495 *Salmonella typhimurium* fdhF FORMATE DEHYDROGENASE LARGE SUBUNIT PRECURSOR (EC 1_2_1_2)
 I_2_1_2 6807 *Salmonella typhimurium* fdoG FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 1006 *Salmonella typhi* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-HYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 I_2_1_2 3064 *Salmonella typhi* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-HYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 I_2_1_2 5456 *Salmonella typhi* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 5457 *Salmonella typhi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 224 *Salmonella paratyphi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 226 *Salmonella paratyphi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 2546 *Salmonella paratyphi* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 2658 *Salmonella paratyphi* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-HYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 I_2_1_2 2659 *Salmonella paratyphi* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-HYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 I_2_1_2 2660 *Salmonella paratyphi* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 2661 *Salmonella paratyphi* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-HYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 I_2_1_2 3952 *Salmonella paratyphi* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)

1_2_1_2 3953 *Salmonella paratyphi* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 3955 *Salmonella paratyphi* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 5743 *Salmonella paratyphi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 5744 *Salmonella paratyphi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 5745 *Salmonella paratyphi* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 1779 *Salmonella enteritidis* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 2754 *Salmonella enteritidis* FORMATE DEHYDROGENASE H (EC 1_2_1_2)
 1_2_1_2 2057 *Salmonella dublin* FORMATE DEHYDROGENASE H (EC 1_2_1_2)
 1_2_1_2 8300 *Saccharomyces cerevisiae* YPL275W FORMATE DEHYDROGENASE (EC 1_2_1_2)
 1_2_1_2 7628 *Pseudomonas aeruginosa* PA5181 FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 1424 *Pasteurella multocida* fdxG_1 FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 1425 *Pasteurella multocida* fdxG_2 FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 158 *Neurospora crassa* fdh FORMATE DEHYDROGENASE (EC 1_2_1_2)
 1_2_1_2 625 *Mycobacterium tuberculosis* fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 656 *Mycobacterium bovis* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 1920 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 4394 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 6452 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-DEHYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 1_2_1_2 6453 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE (EC 1_2_1_2), FORMATE-DEHYDROGEN-LYASE-LINKED, SELENOCYSTEINE-CONTAINING POLYPEPTIDE
 1_2_1_2 6957 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 6959 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 6961 *Klebsiella pneumoniae* FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 759 *Haemophilus influenzae* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 7220 *Haemophilus influenzae* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 7221 *Haemophilus influenzae* HI0006 FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 1434 *Escherichia coli* fdnG FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 4951 *Escherichia coli* b1501 FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 6611 *Escherichia coli* fdoG FORMATE DEHYDROGENASE-O, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 6636 *Escherichia coli* fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 6737 *Escherichia coli* FORMATE DEHYDROGENASE, NITRATE-INDUCIBLE, MAJOR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 2623 *Enterococcus faecalis* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 1379 *Clostridium difficile* BS-yyaE FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 2875 *Clostridium difficile* BS-yoaE FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 3437 *Clostridium difficile* FORMATE DEHYDROGENASE LARGE SUBUNIT PRECURSOR (EC 1_2_1_2)
 1_2_1_2 3438 *Clostridium difficile* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 1975 *Campylobacter jejuni* fdhB FORMATE DEHYDROGENASE IRON-SULFUR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 2965 *Campylobacter jejuni* fdhA FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 509 *Bordetella pertussis* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 510 *Bordetella pertussis* FORMATE DEHYDROGENASE IRON-SULFUR SUBUNIT (EC 1_2_1_2)
 1_2_1_2 3657 *Bordetella pertussis* FORMATE DEHYDROGENASE (EC 1_2_1_2)
 1_2_1_2 4261 *Bordetella pertussis* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 5447 *Bordetella bronchiseptica* FORMATE DEHYDROGENASE BETA CHAIN (EC 1_2_1_2)
 1_2_1_2 5732 *Bordetella bronchiseptica* NAD-DEPENDENT FORMATE DEHYDROGENASE BETA SUBUNIT (EC 1_2_1_2)
 1_2_1_2 5988 *Bordetella bronchiseptica* FORMATE DEHYDROGENASE (EC 1_2_1_2)
 1_2_1_2 6035 *Bordetella bronchiseptica* FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 1_2_1_2 6122 *Bordetella bronchiseptica* NAD-DEPENDENT FORMATE DEHYDROGENASE ALPHA SUBUNIT (EC 1_2_1_2)

I_2_1_2 6889 *Bordetella bronchiseptica* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 8477 *Bordetella bronchiseptica* FORMATE DEHYDROGENASE IRON-SULFUR SUBUNIT (EC 1_2_1_2)
 I_2_1_2 1217 *Bacillus subtilis* yjgC FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 1856 *Bacillus subtilis* yoaE FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 2715 *Bacillus subtilis* yrhE FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_2 4087 *Bacillus subtilis* yyaE FORMATE DEHYDROGENASE ALPHA CHAIN (EC 1_2_1_2)
 I_2_1_22 5616 *Vibrio cholerae* El Tor NI6961 ORF02302 ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 3842 *Staphylococcus aureus* EC-aldB ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 5970 *Salmonella typhimurium* aldB ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 4569 *Salmonella typhi* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 2115 *Salmonella paratyphi* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 3152 *Salmonella enteritidis* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 4528 *Salmonella enteritidis* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 3174 *Salmonella dublin* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 5926 *Pseudomonas aeruginosa* PA3504 ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 594 *Neisseria gonorrhoeae* EC-aldA ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 3631 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 3632 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 3633 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 6838 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 6840 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 6841 *Klebsiella pneumoniae* ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 1375 *Escherichia coli* aldA ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 6090 *Escherichia coli* aldB ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 1623 *Enterococcus faecalis* EC-aldB ALDEHYDE DEHYDROGENASE B (EC 1_2_1_22)
 I_2_1_22 2796 *Campylobacter jejuni* ald' ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_22 2797 *Campylobacter jejuni* ald' ALDEHYDE DEHYDROGENASE A (EC 1_2_1_22)
 I_2_1_38 7307 *Yersinia pseudotuberculosis* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 1385 *Yersinia pestis* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 6393 *Vibrio cholerae* El Tor NI6961 ORF03343 N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 1942 *Streptococcus mutans* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 2317 *Staphylococcus aureus* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 5228 *Salmonella typhimurium* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 1721 *Salmonella typhi* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 2417 *Salmonella paratyphi* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 2418 *Salmonella paratyphi* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 3602 *Salmonella enteritidis* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 986 *Salmonella dublin* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 4070 *Saccharomyces cerevisiae* ARG5,6 ACETYLGLUTAMATE KINASE (EC 2_7_2_8) / N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 8053 *Pseudomonas aeruginosa* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 550 *Pasteurella multocida* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 236 *Neurospora crassa* arg-6 ACETYLGLUTAMATE KINASE (EC 2_7_2_8) / N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 I_2_1_38 677 *Neisseria gonorrhoeae* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)

1_2_1_38 1428 *Mycobacterium tuberculosis* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_38 21 *Mycobacterium leprae* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_38 3093 *Mycobacterium leprae* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_38 1852 *Mycobacterium bovis* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE
 (EC 1_2_1_38)
 1_2_1_38 7474 *Klebsiella pneumoniae* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_38 7475 *Klebsiella pneumoniae* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_38 297 *Haemophilus ducreyi* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_38 3856 *Escherichia coli* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_38 1490 *Corynebacterium diphtheriae* N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE
 (EC 1_2_1_38)
 1_2_1_38 477 *Clostridium difficile* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE
 (EC 1_2_1_38)
 1_2_1_38 901 *Clostridium acetobutylicum* 5110625_F3_42 N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_38 902 *Clostridium acetobutylicum* 6907642_F3_43 N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_38 2148 *Campylobacter jejuni* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE
 (EC 1_2_1_38)
 1_2_1_38 2184 *Bordetella pertussis* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE
 (EC 1_2_1_38)
 1_2_1_38 7446 *Bordetella bronchiseptica* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_38 1120 *Bacillus subtilis* argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC
 1_2_1_38)
 1_2_1_39 8343 *Pseudomonas aeruginosa* PA4073 PHENYLACETALDEHYDE DEHYDROGENASE (EC
 1_2_1_39)
 1_2_1_39 2131 *Klebsiella pneumoniae* PHENYLACETALDEHYDE DEHYDROGENASE (EC 1_2_1_39)
 1_2_1_39 1345 *Escherichia coli* b1385 PHENYLACETALDEHYDE DEHYDROGENASE (EC 1_2_1_39)
 1_2_1_46 8076 *Pseudomonas aeruginosa* fdhA GLUTATHIONE-INDEPENDENT FORMALDEHYDE
 DEHYDROGENASE (EC 1_2_1_46)
 1_2_1_46 4019 *Bacillus subtilis* yycR GLUTATHIONE-INDEPENDENT FORMALDEHYDE
 DEHYDROGENASE (EC 1_2_1_46)
 1_2_1_9 502 *Ureaplasma urealyticum* UU362 NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 1730 *Streptococcus pyogenes* gapN NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 1611 *Streptococcus pneumoniae* EC-gabD NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 87 *Streptococcus mutans* NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 2014 *Streptococcus equi* NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 5631 *Pseudomonas aeruginosa* PA2323 NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 3636 *Clostridium difficile* NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_1_9 1187 *Clostridium acetobutylicum* 2775375_F2_12 NADP-DEPENDENT GLYCERALDEHYDE-3-
 PHOSPHATE DEHYDROGENASE (EC 1_2_1_9)
 1_2_2_2 6213 *Yersinia pseudotuberculosis* EC-poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC
 1_2_2_2)
 1_2_2_2 2144 *Yersinia pestis* EC-poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 2247 *Staphylococcus aureus* EC-poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC
 1_2_2_2)

1_2_2_2 3400 *Salmonella typhimurium* poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 1666 *Salmonella typhi* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 6439 *Salmonella paratyphi* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 6440 *Salmonella paratyphi* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 4201 *Salmonella enteritidis* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 3280 *Salmonella dublin* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 2562 *Pseudomonas aeruginosa* poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 4366 *Pseudomonas aeruginosa* PA2108 PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 1518 *Klebsiella pneumoniae* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 1519 *Klebsiella pneumoniae* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 4671 *Escherichia coli* poxB PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 1650 *Corynebacterium diphtheriae* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 7374 *Bordetella bronchiseptica* PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_2 434 *Bacillus subtilis* ydaP PYRUVATE DEHYDROGENASE (CYTOCHROME) (EC 1_2_2_2)
 1_2_2_4 3880 *Mycobacterium tuberculosis* Rv0375c CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561], MEDIUM CHAIN (EC 1_2_2_4)
 1_2_2_4 3881 *Mycobacterium tuberculosis* Rv0374c CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561] (EC 1_2_2_4), MOLYBDENUM-CONTAINING IRON-SULFUR FLAVOPROTEIN
 1_2_2_4 1254 *Mycobacterium bovis* BS-yurB CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561] (EC 1_2_2_4), MOLYBDENUM-CONTAINING IRON-SULFUR FLAVOPROTEIN
 1_2_2_4 3026 *Mycobacterium bovis* CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561], MEDIUM CHAIN (EC 1_2_2_4)
 1_2_2_4 2791 *Escherichia coli* b2867 CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561], MEDIUM CHAIN (EC 1_2_2_4)
 1_2_2_4 2792 *Escherichia coli* b2868 CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561] (EC 1_2_2_4), MOLYBDENUM-CONTAINING IRON-SULFUR FLAVOPROTEIN
 1_2_2_4 3305 *Bordetella pertussis* BS-yurB CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561] (EC 1_2_2_4), MOLYBDENUM-CONTAINING IRON-SULFUR FLAVOPROTEIN
 1_2_2_4 6712 *Bordetella bronchiseptica* CARBON MONOXIDE OXYGENASE [CYTOCHROME B-561], MEDIUM CHAIN (EC 1_2_2_4)
 1_2_3_3 904 *Streptococcus pneumoniae* EC-poxB PYRUVATE OXIDASE (EC 1_2_3_3)
 1_2_7_1 1920 *Staphylococcus aureus* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 1921 *Staphylococcus aureus* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 1008 *Porphyromonas gingivalis* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 1009 *Porphyromonas gingivalis* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 1010 *Porphyromonas gingivalis* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 1051 *Porphyromonas gingivalis* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 1052 *Porphyromonas gingivalis* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 3085 *Mycobacterium tuberculosis* Rv2454c PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 3087 *Mycobacterium tuberculosis* Rv2455c PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 2772 *Mycobacterium leprae* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 2773 *Mycobacterium leprae* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 2775 *Mycobacterium leprae* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 2776 *Mycobacterium leprae* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 2777 *Mycobacterium leprae* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 2290 *Mycobacterium bovis* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 3488 *Mycobacterium bovis* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 26 *Helicobacter pylori* HP0589 PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 27 *Helicobacter pylori* HP0590 PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 28 *Helicobacter pylori* HP0591 PYRUVATE SYNTHASE SUBUNIT PORC (EC 1_2_7_1)
 1_2_7_1 509 *Helicobacter pylori* HP1108 PORC SUBUNIT OF PYRUVATE:FLAVODOXIN OXIDOREDUCTASE (EC 1_2_7_1)
 1_2_7_1 510 *Helicobacter pylori* HP1109 PYRUVATE SYNTHASE DELTA CHAIN (EC 1_2_7_1)
 1_2_7_1 511 *Helicobacter pylori* HP1110 PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 512 *Helicobacter pylori* HP1111 PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 539 *Helicobacter pylori* J99tr|Q9ZLP1 PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 1_2_7_1 540 *Helicobacter pylori* J99tr|Q9ZLP0 PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_7_1 541 *Helicobacter pylori* J99tr|Q9ZLN9 PYRUVATE SYNTHASE SUBUNIT PORC (EC 1_2_7_1)

I_2_7_1 1025 *Helicobacter pylori* J99 porG PORC SUBUNIT OF PYRUVATE:FLAVODOXIN
 OXIDOREDUCTASE (EC 1_2_7_1)
 I_2_7_1 1026 *Helicobacter pylori* J99 porD PYRUVATE SYNTHASE DELTA CHAIN (EC 1_2_7_1)
 I_2_7_1 1027 *Helicobacter pylori* J99trQ9ZKA4 PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 I_2_7_1 1028 *Helicobacter pylori* J99trQ9ZKA3 PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 1621 *Clostridium difficile* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 3117 *Clostridium difficile* PYRUVATE SYNTHASE SUBUNIT PORC (EC 1_2_7_1)
 I_2_7_1 3118 *Clostridium difficile* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 3561 *Clostridium difficile* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 3562 *Clostridium difficile* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 3563 *Clostridium difficile* PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 I_2_7_1 2824 *Clostridium acetobutylicum* 34433467_C2_18 PYRUVATE SYNTHASE SUBUNIT PORB (EC
 1_2_7_1)
 I_2_7_1 2825 *Clostridium acetobutylicum* 4730443_CI_15 PYRUVATE SYNTHASE ALPHA CHAIN (EC
 1_2_7_1)
 I_2_7_1 1479 *Campylobacter jejuni* oorC PYRUVATE SYNTHASE SUBUNIT PORC (EC 1_2_7_1)
 I_2_7_1 1480 *Campylobacter jejuni* oorB PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 I_2_7_1 1482 *Campylobacter jejuni* oorA PYRUVATE SYNTHASE ALPHA CHAIN (EC 1_2_7_1)
 I_2_99_2 3882 *Mycobacterium tuberculosis* Rv0373c CARBON MONOXIDE DEHYDROGENASE ALPHA
 SUBUNIT (EC 1_2_99_2)
 I_2_99_2 1253 *Mycobacterium bovis* BS-yurC CARBON MONOXIDE DEHYDROGENASE ALPHA SUBUNIT
 (EC 1_2_99_2)
 I_2_99_2 1606 *Clostridium difficile* CARBON MONOXIDE DEHYDROGENASE BETA SUBUNIT (EC
 1_2_99_2)
 I_2_99_2 3291 *Clostridium difficile* CARBON MONOXIDE DEHYDROGENASE BETA SUBUNIT (EC
 1_2_99_2)
 I_2_99_2 3303 *Clostridium difficile* CARBON MONOXIDE DEHYDROGENASE ALPHA SUBUNIT (EC
 1_2_99_2)
 I_2_99_2 1904 *Clostridium acetobutylicum* 553587_F2_3 CARBON MONOXIDE DEHYDROGENASE BETA
 SUBUNIT (EC 1_2_99_2)
 I_2_99_2 2343 *Clostridium acetobutylicum* 275443_C2_7 CARBON MONOXIDE DEHYDROGENASE BETA
 SUBUNIT (EC 1_2_99_2)
 I_2_99_2 2645 *Bordetella pertussis* CARBON MONOXIDE DEHYDROGENASE ALPHA SUBUNIT (EC
 1_2_99_2)
 I_2_99_3 2737 *Pseudomonas aeruginosa* PA1880 MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_2_99_3 8116 *Pseudomonas aeruginosa* PA1601 MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_2_99_3 1475 *Bordetella pertussis* MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_2_99_3 2726 *Bordetella pertussis* MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_2_99_3 2727 *Bordetella pertussis* MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_2_99_3 5683 *Bordetella bronchiseptica* MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE), SMALL SUBUNIT (EC 1_2_99_3)
 I_2_99_3 9767 *Bordetella bronchiseptica* MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 I_3_1_10 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC
 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38;
 EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38;
 EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38;
 EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC
 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC
 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 I_3_1_10 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC
 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

1_3_1_10 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 1_3_1_12 6916 *Yersinia pseudotuberculosis* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 3648 *Yersinia pestis* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 4554 *Vibrio cholerae* El Tor N16961 ORF00940 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 388 *Streptococcus pneumoniae* EC-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 477 *Streptococcus mutans* BS-tyrA PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2544 *Staphylococcus aureus* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 3907 *Salmonella typhimurium* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 4595 *Salmonella typhi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1603 *Salmonella paratyphi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 739 *Salmonella enteritidis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1797 *Salmonella dublin* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 6949 *Saccharomyces cerevisiae* TYR1 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1599 *Pasteurella multocida* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1360 *Neisseria gonorrhoeae* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 3830 *Mycobacterium tuberculosis* tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 3743 *Mycobacterium leprae* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 4093 *Mycobacterium bovis* EC-tyrA PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 7340 *Klebsiella pneumoniae* PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 772 *Helicobacter pylori* HP1380 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1283 *Helicobacter pylori* J99tr|Q9ZJL2 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 10001 *Haemophilus influenzae* HI1290 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 764 *Haemophilus ducreyi* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 765 *Haemophilus ducreyi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 5568 *Escherichia coli* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2438 *Enterococcus faecium* (DOE) EC-tyrA PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2191 *Enterococcus faecalis* EC-tyrA PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2067 *Corynebacterium diphtheriae* PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2414 *Clostridium difficile* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 1751 *Clostridium acetobutylicum* 33829417_F1_5 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 805 *Campylobacter jejuni* tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 194 *Bordetella pertussis* EC-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_12 2257 *Bacillus subtilis* tyrA PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_26 5250 *Yersinia pseudotuberculosis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC 1_3_1_26)
 1_3_1_26 2497 *Yersinia pestis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC 1_3_1_26)

I_3_1_26 6158 *Vibrio cholerae* El Tor N16961 ORF03024 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 678 *Streptococcus pneumoniae* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1413 *Streptococcus mutans* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 3163 *Staphylococcus aureus* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 3639 *Salmonella typhimurium* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 6763 *Salmonella typhimurium* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 786 *Salmonella typhi* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1940 *Salmonella paratyphi* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1941 *Salmonella paratyphi* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 3316 *Salmonella enteritidis* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1402 *Salmonella dublin* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 145 *Rickettsia prowazekii* RP148 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1002 *Pseudomonas aeruginosa* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 882 *Porphyromonas gingivalis* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 855 *Pasteurella multocida* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1749 *Neisseria gonorrhoeae* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 4246 *Mycobacterium tuberculosis* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 152 *Mycobacterium leprae* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 531 *Mycobacterium bovis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 121 *Klebsiella pneumoniae* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1430 *Helicobacter pylori* HP0510 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 464 *Helicobacter pylori* J99sp|Q9ZLW6 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 2777 *Haemophilus influenzae* HI1308 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 931 *Haemophilus ducreyi* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 31 *Escherichia coli* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1727 *Enterococcus faecium* (DOE) DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1509 *Enterococcus faecalis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 236 *Corynebacterium diphtheriae* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1035 *Clostridium difficile* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1038 *Clostridium difficile* DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 3321 *Clostridium acetobutylicum* 23461062_C3_9 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 346 *Chlamydia trachomatis* D/UW-3/Cx EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 805 *Chlamydia pneumoniae* AR39 CP0805 DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 969 *Chlamydia pneumoniae* CWL029 EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 2122 *Campylobacter jejuni* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 1015 *Bordetella pertussis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 8322 *Bordetella bronchiseptica* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_26 2245 *Bacillus subtilis* dapB DIHYDRODIPICOLINATE REDUCTASE (EC I_3_1_26)
 I_3_1_28 5065 *Yersinia pseudotuberculosis* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 870 *Yersinia pestis* BS-yqjQ 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 4629 *Vibrio cholerae* El Tor N16961 ORF01036 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 4812 *Vibrio cholerae* El Tor N16961 ORF01294 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 2961 *Salmonella typhimurium* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 6589 *Salmonella typhimurium* ybbo 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 344 *Salmonella typhi* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 3579 *Salmonella typhi* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 933 *Salmonella paratyphi* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)
 I_3_1_28 1233 *Salmonella paratyphi* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC I_3_1_28)

1_3_1_28 1234 *Salmonella paratyphi* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 993 *Salmonella enteritidis* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 3964 *Salmonella enteritidis* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 2432 *Klebsiella pneumoniae* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 2433 *Klebsiella pneumoniae* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 4367 *Klebsiella pneumoniae* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 306 *Helicobacter pylori* HP0890 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 821 *Helicobacter pylori* J99tr|Q9ZKW1 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 288 *Haemophilus ducreyi* BS-yqjQ 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 577 *Escherichia coli* entA 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 4497 *Escherichia coli* b0493 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_28 3195 *Bacillus subtilis* dhbA 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_31 211 *Clostridium acetobutylicum* 4803135_F3_74 2-ENOATE REDUCTASE (EC 1_3_1_31)
 1_3_1_31 1565 *Clostridium acetobutylicum* 33985077_F2_6 2-ENOATE REDUCTASE (EC 1_3_1_31)
 1_3_1_33 2343 *Mycobacterium tuberculosis* Rv0303 PROTOCHLOROPHYLLIDE REDUCTASE PRECURSOR (EC 1_3_1_33)
 1_3_1_33 2522 *Mycobacterium bovis* PROTOCHLOROPHYLLIDE REDUCTASE PRECURSOR (EC 1_3_1_33)
 1_3_1_43 388 *Streptococcus pneumoniae* EC-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 2544 *Staphylococcus aureus* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 1360 *Neisseria gonorrhoeae* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 3830 *Mycobacterium tuberculosis* tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 3743 *Mycobacterium leprae* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 772 *Helicobacter pylori* HP1380 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 1283 *Helicobacter pylori* J99tr|Q9ZJL2 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 2414 *Clostridium difficile* BS-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 1751 *Clostridium acetobutylicum* 33829417_F1_5 AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 805 *Campylobacter jejuni* tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_43 194 *Bordetella pertussis* EC-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_54 976 *Salmonella typhimurium* sp|Q05591 PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 2589 *Salmonella typhi* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 6929 *Salmonella paratyphi* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 6930 *Salmonella paratyphi* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 3260 *Salmonella enteritidis* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 3658 *Salmonella dublin* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 5848 *Pseudomonas aeruginosa* PA2909 PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 1223 *Mycobacterium tuberculosis* cobK PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 2417 *Mycobacterium bovis* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 6267 *Klebsiella pneumoniae* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 1523 *Corynebacterium diphtheriae* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)

1_3_1_54 919 *Clostridium difficile* PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_54 2056 *Clostridium acetobutylicum* 5117313_C2_27 PRECORRIN-6X REDUCTASE (EC 1_3_1_54)
 1_3_1_55 4285 *Pseudomonas aeruginosa* xylL CIS-1,2-DIHYDROXYCYCLOHEXA-3,5-DIENE-1-CARBOXYLATE DEHYDROGENASE (EC 1_3_1_55)
 1_3_1_55 2793 *Klebsiella pneumoniae* CIS-1,2-DIHYDROXYCYCLOHEXA-3,5-DIENE-1-CARBOXYLATE DEHYDROGENASE (EC 1_3_1_55)
 1_3_1_6 450 *Streptococcus mutans* fumarate reductase (NADH) (EC 1_3_1_6)
 1_3_1_6 2120 *Streptococcus mutans* fumarate reductase (NADH) (EC 1_3_1_6)
 1_3_1_6 5311 *Saccharomyces cerevisiae* YEL047C fumarate reductase (NADH) (EC 1_3_1_6)
 1_3_1_6 4032 *Enterococcus faecium* (DOE) FUMARATE REDUCTASE [NADH] (EC 1_3_1_6)
 1_3_1_6 652 *Enterococcus faecalis* FUMARATE REDUCTASE [NADH] (EC 1_3_1_6)
 1_3_1_9 73 *Streptococcus pyogenes* fabK ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1120 *Streptococcus pneumoniae* ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1452 *Streptococcus mutans* BS-yrpB ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1983 *Streptococcus mutans* ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 141 *Streptococcus equi* ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 2946 *Staphylococcus aureus* EC-fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 368 *Salmonella typhimurium* envM ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1077 *Salmonella typhi* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 2103 *Salmonella paratyphi* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 6145 *Salmonella paratyphi* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 6146 *Salmonella paratyphi* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 2062 *Salmonella enteritidis* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3- HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 1_3_1_9 358 *Rickettsia prowazekii* RP365 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 5261 *Pseudomonas aeruginosa* fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 8528 *Pseudomonas aeruginosa* PA3507 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1371 *Porphyromonas gingivalis* ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 195 *Pasteurella multocida* fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1563 *Neisseria gonorrhoeae* EC-fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 677 *Mycobacterium tuberculosis* inhA ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1725 *Mycobacterium leprae* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1868 *Mycobacterium leprae* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 390 *Mycobacterium bovis* P46533 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 7719 *Klebsiella pneumoniae* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1146 *Helicobacter pylori* HP0195 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)

1_3_1_9 185 *Helicobacter pylori* J99sp|Q9ZMN7 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 10975 *Haemophilus influenzae* H11734 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 611 *Haemophilus ducreyi* EC-fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 4856 *Escherichia coli* fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 386 *Enterococcus faecium* (DOE) ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 146 *Enterococcus faecalis* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1393 *Enterococcus faecalis* EC-fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 3024 *Clostridium difficile* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 62 *Clostridium acetobutylicum* 24228377_C2_173 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 101 *Chlamydia trachomatis* D/UW-3/Cx fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) PRECURSOR (EC 1_3_1_9)
 1_3_1_9 349 *Chlamydia pneumoniae* AR39 CP0349 ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) PRECURSOR (EC 1_3_1_9)
 1_3_1_9 367 *Chlamydia pneumoniae* CWL029 fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) PRECURSOR (EC 1_3_1_9)
 1_3_1_9 650 *Campylobacter jejuni* fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 17 *Bordetella pertussis* EC-fabI ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 1497 *Bordetella pertussis* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 7993 *Bordetella bronchiseptica* ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_1_9 864 *Bacillus subtilis* yfHr ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (fabL) (NADPH) (EC 1_3_1_9)
 1_3_1_9 1173 *Bacillus subtilis* yjBW ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_99_16 827 *Pseudomonas aeruginosa* PA1602 ISOQUINOLINE 1-OXIDOREDUCTASE ALPHA SUBUNIT (EC 1_3_99_16)
 1_3_99_4 6227 *Pseudomonas aeruginosa* PA2243 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 888 *Mycobacterium tuberculosis* Rv0785 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 1014 *Mycobacterium tuberculosis* Rv3537 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 552 *Mycobacterium bovis* 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 6753 *Klebsiella pneumoniae* 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 9266 *Klebsiella pneumoniae* 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_3_99_4 7927 *Bordetella bronchiseptica* 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_4_1_1 5701 *Vibrio cholerae* El Tor N16961 ORF02403 ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 442 *Streptococcus pneumoniae* EC-pntA ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 443 *Streptococcus pneumoniae* ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 894 *Staphylococcus aureus* ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 3169 *Staphylococcus aureus* ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 4240 *Mycobacterium tuberculosis* ald ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 150 *Mycobacterium leprae* ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 525 *Mycobacterium bovis* EC-pntA ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 787 *Helicobacter pylori* HP1398 ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 1416 *Helicobacter pylori* J99 ald ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_1 3186 *Bacillus subtilis* ald ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_13 7734 *Yersinia pseudotuberculosis* EC-ghlB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 7735 *Yersinia pseudotuberculosis* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 3362 *Yersinia pestis* EC-ghlB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 5109 *Yersinia pestis* EC-yffG GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 5155 *Yersinia pestis* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6143 *Vibrio cholerae* El Tor N16961 ORF03006 GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)

1_4_1_13 6144 *Vibrio cholerae* El Tor N16961 ORF03007 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 505 *Treponema pallidum* TP0735 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1205 *Streptococcus mutans* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1206 *Streptococcus mutans* EC-gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 1551 *Staphylococcus aureus* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 1835 *Staphylococcus aureus* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1836 *Staphylococcus aureus* EC-gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 3412 *Salmonella typhimurium* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6098 *Salmonella typhimurium* gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 6101 *Salmonella typhimurium* gltD GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 735 *Salmonella typhi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 3006 *Salmonella typhi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 5379 *Salmonella typhi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 895 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 898 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 899 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 901 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1354 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1355 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1356 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 3430 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 3431 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 5149 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 7088 *Salmonella paratyphi* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 2587 *Salmonella enteritidis* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 3059 *Salmonella dublin* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 4130 *Saccharomyces cerevisiae* GLT1 GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 6 *Rickettsia prowazekii* RP006 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 2913 *Pseudomonas aeruginosa* gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 5881 *Pseudomonas aeruginosa* PA0440 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 8617 *Pseudomonas aeruginosa* gltD GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 287 *Mycobacterium tuberculosis* gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 288 *Mycobacterium tuberculosis* gltD GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1625 *Mycobacterium leprae* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1626 *Mycobacterium leprae* EC-gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 994 *Mycobacterium bovis* EC-gltB GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 995 *Mycobacterium bovis* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)

1_4_1_13 6098 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 6099 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 6100 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 6101 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 6102 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 6103 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 6104 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 6105 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6106 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6107 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6108 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6494 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 6495 *Klebsiella pneumoniae* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 2095 *Escherichia coli* b2146 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 3135 *Escherichia coli* gltB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 3136 *Escherichia coli* gltD GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 5497 *Escherichia coli* yffG GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 5709 *Escherichia coli* b2887 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 655 *Enterococcus faecalis* BS-gltA GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1605 *Clostridium difficile* GLUTAMATE SYNTHASE (NADPH) (EC 1_4_1_13)
 1_4_1_13 2566 *Clostridium difficile* GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 2604 *Clostridium difficile* GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 345 *Clostridium acetobutylicum* 26460938_C3_119 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 2102 *Clostridium acetobutylicum* 24505468_C3_30 GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 2103 *Clostridium acetobutylicum* 5897938_C3_29 GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 2105 *Clostridium acetobutylicum* 34103388_C1_24 GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 1103 *Campylobacter jejuni* gltB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 1112 *Campylobacter jejuni* gltD GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 819 *Bordetella pertussis* GLUTAMATE SYNTHASE (NADPH) LARGE CHAIN PRECURSOR (EC 1_4_1_13)
 1_4_1_13 1273 *Bordetella pertussis* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1274 *Bordetella pertussis* EC-gltB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 5535 *Bordetella bronchiseptica* GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 6292 *Bordetella bronchiseptica* BS-gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 7628 *Bordetella bronchiseptica* GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_13 1843 *Bacillus subtilis* gltB GLUTAMATE SYNTHASE (NADPH) SMALL CHAIN (EC 1_4_1_13)
 1_4_1_13 1844 *Bacillus subtilis* gltA GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_16 523 *Porphyromonas gingivalis* MESO-DIAMINOPIMELATE D-DEHYDROGENASE (EC 1_4_1_16)
 1_4_1_2 5304 *Vibrio cholerae* El Tor N16961 ORF01910 NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_2)
 1_4_1_2 2950 *Saccharomyces cerevisiae* GDH2 NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_2)
 1_4_1_2 202 *Pseudomonas aeruginosa* PA3068 NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_2)
 1_4_1_2 971 *Porphyromonas gingivalis* EC-gdhA NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_2)

I_4_1_2 201 *Neurospora crassa* AAA33601_I NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 308 *Neurospora crassa* *gdh* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 204 *Neisseria gonorrhoeae* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 3099 *Mycobacterium tuberculosis* Rv2476c NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 2138 *Mycobacterium leprae* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 2464 *Mycobacterium leprae* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 440 *Mycobacterium bovis* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 1601 *Clostridium difficile* spP27346 NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 2292 *Bacillus subtilis* *ypcA* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_2 3773 *Bacillus subtilis* *yweB* NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_2)
 I_4_1_4 2029 *Yersinia pestis* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 804 *Streptococcus pneumoniae* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 335 *Streptococcus mutans* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 319 *Streptococcus equi* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 2672 *Staphylococcus aureus* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 6160 *Salmonella typhimurium* *gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 3529 *Salmonella typhi* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 957 *Salmonella paratyphi* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 4113 *Salmonella dublin* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 6482 *Saccharomyces cerevisiae* GDH3 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 8270 *Saccharomyces cerevisiae* GDH1 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 7537 *Pseudomonas aeruginosa* *gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 976 *Pasteurella multocida* *gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 79 *Neurospora crassa* AAA33557_I NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 80 *Neurospora crassa* AAA33558_I NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 81 *Neurospora crassa* AAA33559_I NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 20221 *Neurospora crassa* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 72 *Neisseria gonorrhoeae* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 203 *Neisseria gonorrhoeae* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 502 *Klebsiella pneumoniae* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 6084 *Klebsiella pneumoniae* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 1317 *Helicobacter pylori* HP0380 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 992 *Helicobacter pylori* J99sp|Q9ZKD8 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 7643 *Haemophilus influenzae* HI0189 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 1718 *Escherichia coli* *gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 1172 *Enterococcus faecalis* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 1796 *Corynebacterium diphtheriae* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 1800 *Clostridium acetobutylicum* 20501592_F3_13 NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 2947 *Bordetella pertussis* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_4 8047 *Bordetella bronchiseptica* EC-*gdhA* NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC I_4_1_4)
 I_4_1_9 5327 *Pseudomonas aeruginosa* *ldh* LEUCINE DEHYDROGENASE (EC I_4_1_9)
 I_4_1_9 742 *Chlamydia trachomatis* D/UW-3/Cx BS-yqIT LEUCINE DEHYDROGENASE (EC I_4_1_9)
 I_4_1_9 947 *Chlamydia pneumoniae* AR39 CP0947 LEUCINE DEHYDROGENASE (EC I_4_1_9)

I_4_1_9 850 *Chlamydia pneumoniae* CWL029 BS-yqIT LEUCINE DEHYDROGENASE (EC 1_4_1_9)
 I_4_1_9 2403 *Bacillus subtilis* yqIT LEUCINE DEHYDROGENASE (EC 1_4_1_9)
 I_4_3_16 6756 *Yersinia pseudotuberculosis* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 603 *Yersinia pestis* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 6226 *Vibrio cholerae* El Tor N16961 ORF03122 L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 4328 *Salmonella typhimurium* nicB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 5253 *Salmonella typhi* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 3230 *Salmonella paratyphi* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1886 *Salmonella enteritidis* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 3108 *Salmonella dublin* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1959 *Pseudomonas aeruginosa* nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1392 *Porphyromonas gingivalis* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1087 *Neisseria gonorrhoeae* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 2617 *Mycobacterium tuberculosis* nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1573 *Mycobacterium leprae* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 3182 *Mycobacterium bovis* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 5505 *Klebsiella pneumoniae* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 2514 *Escherichia coli* nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 1184 *Corynebacterium diphtheriae* L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 2720 *Clostridium difficile* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 2132 *Clostridium acetobutylicum* 38069002_F1_1 L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_16 2781 *Bacillus subtilis* nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 I_4_3_2 1900 *Bacillus subtilis* yobN L-AMINO ACID OXIDASE (EC 1_4_3_2)
 I_4_7_1 6140 *Vibrio cholerae* El Tor N16961 ORF03003 FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE I (EC 1_4_7_1)
 I_4_7_1 2010 *Pseudomonas aeruginosa* PA3602 FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE (EC 1_4_7_1)
 I_4_7_1 2104 *Clostridium acetobutylicum* 2581250_C2_27 FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE I (EC 1_4_7_1)
 I_4_7_1 818 *Bordetella pertussis* FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE (EC 1_4_7_1)
 I_4_7_1 3907 *Bordetella pertussis* BS-yerD FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE (EC 1_4_7_1)
 I_4_7_1 6419 *Bordetella bronchiseptica* BS-yerD FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE (EC 1_4_7_1)
 I_4_7_1 660 *Bacillus subtilis* yerD FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE (EC 1_4_7_1)
 I_4_99_1 5331 *Yersinia pseudotuberculosis* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 6002 *Yersinia pseudotuberculosis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 3789 *Yersinia pestis* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 4477 *Yersinia pestis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 4641 *Vibrio cholerae* El Tor N16961 ORF01052 D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 1393 *Streptococcus pyogenes* BS-yurR D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 792 *Streptococcus pneumoniae* BS-yurR D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 1186 *Streptococcus mutans* BS-yurR D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 4472 *Salmonella typhimurium* dadR D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 79 *Salmonella typhi* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 2482 *Salmonella paratyphi* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 2483 *Salmonella paratyphi* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 4058 *Salmonella enteritidis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 2174 *Salmonella dublin* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 7387 *Pseudomonas aeruginosa* dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 8614 *Pseudomonas aeruginosa* PA5084 D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 I_4_99_1 606 *Pasteurella multocida* D-AMINO ACID DEHYDROGENASE LARGE SUBUNIT (EC 1_4_99_1)

I_4_99_1 502 *Neisseria gonorrhoeae* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 1237 *Klebsiella pneumoniae* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 2209 *Klebsiella pneumoniae* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 358 *Helicobacter pylori* HP0943 D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 875 *Helicobacter pylori* J99sp|Q9ZKQ7 D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 1151 *Escherichia coli* dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 2556 *Enterococcus faecium* (DOE) D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 1315 *Enterococcus faecalis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 2028 *Corynebacterium diphtheriae* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 13 *Borrelia burgdorferi* BB0756 D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 1238 *Bordetella pertussis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 3224 *Bordetella pertussis* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 3265 *Bordetella pertussis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 3760 *Bordetella pertussis* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 4929 *Bordetella bronchiseptica* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 5351 *Bordetella bronchiseptica* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 6155 *Bordetella bronchiseptica* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 8285 *Bordetella bronchiseptica* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 9212 *Bordetella bronchiseptica* D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 3258 *Bacillus subtilis* yurR D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC I_4_99_1)
 I_4_99_1 3668 *Bacillus subtilis* ywmD D-AMINO ACID DEHYDROGENASE LARGE SUBUNIT (EC I_4_99_1)
 I_5_1_19 57 *Pseudomonas aeruginosa* hcnB D-nopaline dehydrogenase (EC I_5_1_19)
 I_5_1_28 1247 *Staphylococcus aureus* OPINE DEHYDROGENASE (EC I_5_1_28)
 I_5_1_7 284 *Saccharomyces cerevisiae* LYS1 SACCHAROPINE DEHYDROGENASE (NAD⁺, L-LYSINE FORMING) (EC I_5_1_7)
 I_5_3_1 216 *Yersinia pestis* SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 5197 *Salmonella typhimurium* solA SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 1237 *Salmonella typhi* SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 1527 *Salmonella paratyphi* SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 1528 *Salmonella paratyphi* SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 3134 *Salmonella enteritidis* PUTATIVE SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 2513 *Salmonella dublin* PUTATIVE SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 59 *Pseudomonas aeruginosa* hcnA SARCOSINE OXIDASE ALPHA SUBUNIT (EC I_5_3_1)
 I_5_3_1 154 *Pseudomonas aeruginosa* soxD SARCOSINE OXIDASE DELTA SUBUNIT (EC I_5_3_1)
 I_5_3_1 5004 *Pseudomonas aeruginosa* soxG SARCOSINE OXIDASE GAMMA SUBUNIT (EC I_5_3_1)
 I_5_3_1 5645 *Pseudomonas aeruginosa* soxB SARCOSINE OXIDASE BETA SUBUNIT (EC I_5_3_1)
 I_5_3_1 5689 *Pseudomonas aeruginosa* PA1488 SARCOSINE OXIDASE ALPHA SUBUNIT (EC I_5_3_1)
 I_5_3_1 6006 *Pseudomonas aeruginosa* PA1028 SARCOSINE OXIDASE BETA SUBUNIT (EC I_5_3_1)
 I_5_3_1 6721 *Pseudomonas aeruginosa* PA3863 SARCOSINE OXIDASE BETA SUBUNIT (EC I_5_3_1)
 I_5_3_1 8077 *Pseudomonas aeruginosa* soxA SARCOSINE OXIDASE ALPHA SUBUNIT (EC I_5_3_1)
 I_5_3_1 7136 *Klebsiella pneumoniae* SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 4752 *Escherichia coli* b1059 SARCOSINE OXIDASE (EC I_5_3_1)
 I_5_3_1 962 *Clostridium acetobutylicum* 789635_C1_51 SARCOSINE OXIDASE ALPHA SUBUNIT (EC I_5_3_1)
 I_5_3_1 2442 *Clostridium acetobutylicum* 3942143_C3_29 SARCOSINE OXIDASE ALPHA SUBUNIT (EC I_5_3_1)
 I_5_3_1 209 *Bordetella pertussis* SARCOSINE OXIDASE BETA SUBUNIT (EC I_5_3_1)

1_5_3_1 3048 *Bordetella pertussis* SARCOSINE OXIDASE GAMMA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 3049 *Bordetella pertussis* SARCOSINE OXIDASE ALPHA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 3050 *Bordetella pertussis* SARCOSINE OXIDASE BETA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 3805 *Bordetella pertussis* SARCOSINE OXIDASE BETA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 4755 *Bordetella pertussis* SARCOSINE OXIDASE DELTA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 8077 *Bordetella bronchiseptica* SARCOSINE OXIDASE BETA SUBUNIT (EC 1_5_3_1)
 1_5_3_1 9593 *Bordetella bronchiseptica* SARCOSINE OXIDASE BETA SUBUNIT (EC 1_5_3_1)
 1_5_3_6 1593 *Yersinia pestis* 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_3_6 3586 *Mycobacterium tuberculosis* Rv1726 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_3_6 138 *Mycobacterium bovis* 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_3_6 879 *Bacillus subtilis* ygaK 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_3_6 3447 *Bacillus subtilis* yvdP 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_99_2 2270 *Pseudomonas aeruginosa* PA5309 DIMETHYLGLYCINE DEHYDROGENASE (EC 1_5_99_2)
 1_5_99_4 20548 *Neurospora crassa* NICOTINE DEHYDROGENASE (EC 1_5_99_4)
 1_5_99_4 3303 *Bordetella pertussis* NICOTINE DEHYDROGENASE (EC 1_5_99_4)
 1_5_99_4 3304 *Bordetella pertussis* NICOTINE DEHYDROGENASE (EC 1_5_99_4)
 1_5_99_4 5052 *Bordetella bronchiseptica* NICOTINE DEHYDROGENASE (EC 1_5_99_4)
 1_5_99_8 7719 *Yersinia pseudotuberculosis* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 3629 *Yersinia pestis* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 4963 *Yersinia pestis* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 7573 *Vibrio cholerae* El Tor N16961ORFA00849 PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 1984 *Staphylococcus aureus* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 1534 *Salmonella typhimurium* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 1536 *Salmonella typhimurium* putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 232 *Salmonella typhi* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 465 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 1391 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 1392 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 1393 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 1394 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 6939 *Salmonella paratyphi* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 8536 *Pseudomonas aeruginosa* putA PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 1546 *Pasteurella multocida* putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 1077 *Neisseria gonorrhoeae* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 4414 *Mycobacterium tuberculosis* Rv1188 PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 2099 *Mycobacterium bovis* BS-yusM PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5147 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5148 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5149 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5150 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5152 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 5153 *Klebsiella pneumoniae* PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)

1_5_99_8 1016 *Helicobacter pylori* HP0056 PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 48 *Helicobacter pylori* J99 putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 4733 *Escherichia coli* putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 1960 *Campylobacter jejuni* putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 2799 *Bordetella pertussis* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 2801 *Bordetella pertussis* PROLINE DEHYDROGENASE (EC 1_5_99_8)
 1_5_99_8 7693 *Bordetella bronchiseptica* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 321 *Bacillus subtilis* ycgM PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_8 3279 *Bacillus subtilis* yusM PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1-PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_9 825 *Mycobacterium tuberculosis* Rv2951c F420-DEPENDENT METHYLENETETRAHYDROMETHANOPTERIN DEHYDROGENASE (EC 1_5_99_9)
 1_5_99_9 1655 *Mycobacterium leprae* F420-DEPENDENT METHYLENETETRAHYDROMETHANOPTERIN DEHYDROGENASE (EC 1_5_99_9)
 1_5_99_9 206 *Mycobacterium bovis* F420-DEPENDENT METHYLENETETRAHYDROMETHANOPTERIN DEHYDROGENASE (EC 1_5_99_9)
 1_6_1_1 2656 *Salmonella enteritidis* SOLUBLE PYRIDINE NUCLEOTIDE TRANSHYDROGENASE (EC 1_6_1_1)
 1_6_1_1 833 *Rickettsia prowazekii* RP862 NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 557 *Porphyromonas gingivalis* EC-pntA NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 3626 *Mycobacterium tuberculosis* pntAB NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 2862 *Mycobacterium leprae* EC-pntA NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 866 *Mycobacterium bovis* EC-pntA NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 3738 *Bordetella pertussis* NAD(P) TRANSHYDROGENASE PRECURSOR (EC 1_6_1_1)
 1_6_1_1 9560 *Bordetella bronchiseptica* NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_1_1 9561 *Bordetella bronchiseptica* EC-pntA NAD(P) TRANSHYDROGENASE SUBUNIT ALPHA (EC 1_6_1_1)
 1_6_6_1 2837 *Salmonella typhimurium* NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_1 2152 *Salmonella paratyphi* NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_1 2153 *Salmonella paratyphi* NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_1 3177 *Pseudomonas aeruginosa* PA4882 NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_1 1252 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_1 1924 *Escherichia coli* b1971 NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_3 7493 *Yersinia pseudotuberculosis* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 2955 *Yersinia pestis* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 4617 *Salmonella typhi* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 3443 *Pseudomonas aeruginosa* PA4692 NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 710 *Pasteurella multocida* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 210 *Neurospora crassa* nit-3 NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 50 *Haemophilus ducreyi* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 2378 *Campylobacter jejuni* Cj0379c NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 205 *Bordetella pertussis* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_3 7828 *Bordetella bronchiseptica* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_4 7870 *Yersinia pseudotuberculosis* EC-nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC 1_6_6_4)
 1_6_6_4 7871 *Yersinia pseudotuberculosis* EC-nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC 1_6_6_4)
 1_6_6_4 1482 *Yersinia pestis* EC-nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC 1_6_6_4)
 1_6_6_4 1483 *Yersinia pestis* EC-nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC 1_6_6_4)
 1_6_6_4 1666 *Staphylococcus aureus* BS-nasE NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC 1_6_6_4)

I_6_6_4 1667 *Staphylococcus aureus* EC-nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 4281 *Salmonella typhimurium* nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 4285 *Salmonella typhimurium* nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 1465 *Salmonella typhi* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 5538 *Salmonella typhi* NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 4565 *Salmonella paratyphi* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 4566 *Salmonella paratyphi* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 4830 *Salmonella paratyphi* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 3193 *Salmonella enteritidis* NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 3194 *Salmonella enteritidis* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 3543 *Salmonella dublin* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 1480 *Pseudomonas aeruginosa* nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 8404 *Pseudomonas aeruginosa* nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 20261 *Neurospora crassa* NITRITE REDUCTASE (NAD(P)H) (EC I_6_6_4)
 I_6_6_4 4034 *Mycobacterium tuberculosis* nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 4036 *Mycobacterium tuberculosis* nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 303 *Mycobacterium bovis* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 1934 *Mycobacterium bovis* EC-nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 1935 *Mycobacterium bovis* EC-nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 1650 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 1651 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 2569 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 6332 *Klebsiella pneumoniae* NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 6333 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 6334 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 6336 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 6337 *Klebsiella pneumoniae* NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 3283 *Escherichia coli* nirB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 3284 *Escherichia coli* nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 1934 *Clostridium acetobutylicum* 5120452_C2_31 NITRITE REDUCTASE (NAD(P)H) (EC I_6_6_4)
 I_6_6_4 330 *Bacillus subtilis* nasE NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC I_6_6_4)
 I_6_6_4 331 *Bacillus subtilis* nasD NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_4 333 *Bacillus subtilis* nasB NITRITE REDUCTASE [NAD(P)H] LARGE SUBUNIT (EC I_6_6_4)
 I_6_6_9 5490 *Vibrio cholerae* El Tor N16961 ORF02162 TRIMETHYLAMINE-N-OXIDE REDUCTASE PRECURSOR (EC I_6_6_9)
 I_6_6_9 5746 *Vibrio cholerae* El Tor N16961 ORF02459 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 5854 *Salmonella typhimurium* torA TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 913 *Salmonella typhi* TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 2567 *Salmonella paratyphi* TRIMETHYLAMINE-N-OXIDE REDUCTASE PRECURSOR (EC I_6_6_9)
 I_6_6_9 2568 *Salmonella paratyphi* TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 3432 *Salmonella enteritidis* TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 4052 *Salmonella dublin* TRIMETHYLAMINE-N-OXIDE REDUCTASE PRECURSOR (EC I_6_6_9)
 I_6_6_9 6 *Pasteurella multocida* torA TRIMETHYLAMINE-N-OXIDE REDUCTASE PRECURSOR (EC I_6_6_9)
 I_6_6_9 1344 *Helicobacter pylori* HP0407 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 965 *Helicobacter pylori* J99trQ9ZKG2 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 13279 *Haemophilus influenzae* HI0643 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 929 *Haemophilus ducreyi* EC-bisZ TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 960 *Escherichia coli* torA TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 5145 *Escherichia coli* bisZ TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 3925 *Clostridium acetobutylicum* 34569216_C2_11 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)

I_6_6_9 3926 *Clostridium acetobutylicum* 24695318_CI_8 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_6_9 3927 *Clostridium acetobutylicum* 31895662_C3_12 TRIMETHYLAMINE-N-OXIDE REDUCTASE (EC I_6_6_9)
 I_6_8_1 5170 *Yersinia pestis* NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_6_8_1 1004 *Staphylococcus aureus* NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_6_8_1 866 *Pseudomonas aeruginosa* PA3446 NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_6_8_1 5753 *Klebsiella pneumoniae* NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_6_8_1 4698 *Escherichia coli* b0937 NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_6_8_1 5745 *Bordetella bronchiseptica* NADH-DEPENDENT FMN REDUCTASE (EC I_6_8_1)
 I_7_7_1 590 *Mycobacterium tuberculosis* nirA FERREDOXIN--NITRITE REDUCTASE (EC I_7_7_1)
 I_7_7_1 456 *Mycobacterium bovis* FERREDOXIN--NITRITE REDUCTASE (EC I_7_7_1)
 I_7_7_1 457 *Mycobacterium bovis* FERREDOXIN--NITRITE REDUCTASE (EC I_7_7_1)
 I_7_7_1 3121 *Clostridium difficile* FERREDOXIN--NITRITE REDUCTASE (EC I_7_7_1)
 I_7_7_1 444 *Clostridium acetobutylicum* 992202_C2_79 FERREDOXIN--NITRITE REDUCTASE (EC I_7_7_1)
 I_7_99_4 7910 *Yersinia pseudotuberculosis* EC-napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 298 *Yersinia pestis* EC-napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 7184 *Vibrio cholerae* El Tor N16961ORFA00362 PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1637 *Staphylococcus aureus* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1737 *Staphylococcus aureus* BS-narG NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1795 *Staphylococcus aureus* EC-narV NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 1796 *Staphylococcus aureus* EC-narJ NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1797 *Staphylococcus aureus* EC-narY NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 2874 *Salmonella typhimurium* napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 3435 *Salmonella typhimurium* narH RESPIRATORY NITRATE REDUCTASE I BETA CHAIN (EC I_7_99_4)
 I_7_99_4 3436 *Salmonella typhimurium* narJ NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 3437 *Salmonella typhimurium* chlI RESPIRATORY NITRATE REDUCTASE I GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 4782 *Salmonella typhimurium* narZ RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4783 *Salmonella typhimurium* narY NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4784 *Salmonella typhimurium* narW NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 4786 *Salmonella typhimurium* narV NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 6964 *Salmonella typhimurium* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1646 *Salmonella typhi* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1946 *Salmonella typhi* RESPIRATORY NITRATE REDUCTASE 2 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 1947 *Salmonella typhi* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 2169 *Salmonella typhi* RESPIRATORY NITRATE REDUCTASE I GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 2543 *Salmonella typhi* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 3755 *Salmonella typhi* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 4522 *Salmonella typhi* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 4523 *Salmonella typhi* RESPIRATORY NITRATE REDUCTASE I BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4940 *Salmonella typhi* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 2405 *Salmonella paratyphi* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 2406 *Salmonella paratyphi* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 2408 *Salmonella paratyphi* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 3556 *Salmonella paratyphi* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 3942 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 3943 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4298 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 4299 *Salmonella paratyphi* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4300 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE I BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4301 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4302 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 BETA CHAIN (EC I_7_99_4)

I_7_99_4 4304 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4306 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 1 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 5005 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 1 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 5008 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 1 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 5009 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 1 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 5010 *Salmonella paratyphi* RESPIRATORY NITRATE REDUCTASE 1 DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 5011 *Salmonella paratyphi* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 5012 *Salmonella paratyphi* NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 1201 *Salmonella enteritidis* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 2051 *Salmonella enteritidis* RESPIRATORY NITRATE REDUCTASE 1 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 2600 *Salmonella enteritidis* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 3544 *Salmonella enteritidis* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 3545 *Salmonella enteritidis* NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 362 *Salmonella dublin* RESPIRATORY NITRATE REDUCTASE 2 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 1389 *Salmonella dublin* RESPIRATORY NITRATE REDUCTASE 1 DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 1748 *Salmonella dublin* RESPIRATORY NITRATE REDUCTASE 2 GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 4072 *Salmonella dublin* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 4309 *Salmonella dublin* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 2592 *Pseudomonas aeruginosa* napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 3522 *Pseudomonas aeruginosa* narJ NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 3523 *Pseudomonas aeruginosa* narI RESPIRATORY NITRATE REDUCTASE 2 GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 6713 *Pseudomonas aeruginosa* narG NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 6714 *Pseudomonas aeruginosa* narH RESPIRATORY NITRATE REDUCTASE 2 BETA CHAIN (EC I_7_99_4)
 I_7_99_4 8403 *Pseudomonas aeruginosa* PA 1779 NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 351 *Pasteurella multocida* napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1232 *Mycobacterium tuberculosis* narX NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4387 *Mycobacterium tuberculosis* narG NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4388 *Mycobacterium tuberculosis* narH NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4389 *Mycobacterium tuberculosis* narJ NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 4390 *Mycobacterium tuberculosis* narI NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 170 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4) (fragment)
 I_7_99_4 173 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4) (fragment)
 I_7_99_4 174 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 176 *Mycobacterium leprae* NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 177 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1771 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1772 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1773 *Mycobacterium leprae* NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 2905 *Mycobacterium leprae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1148 *Mycobacterium bovis* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1370 *Mycobacterium bovis* NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 1371 *Mycobacterium bovis* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1802 *Mycobacterium bovis* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 3802 *Mycobacterium bovis* EC-narY NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 3803 *Mycobacterium bovis* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 3804 *Mycobacterium bovis* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1532 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 1 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1533 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 1 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1534 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 1 ALPHA CHAIN (EC I_7_99_4)

I_7_99_4 1535 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1605 *Klebsiella pneumoniae* Respiratory nitrate reductase I alpha chain (EC I_7_99_4)
 I_7_99_4 1606 *Klebsiella pneumoniae* Respiratory nitrate reductase I alpha chain (EC I_7_99_4)
 I_7_99_4 1607 *Klebsiella pneumoniae* Respiratory nitrate reductase I alpha chain (EC I_7_99_4)
 I_7_99_4 1608 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1652 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 1653 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 1654 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 1655 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 1656 *Klebsiella pneumoniae* NITRATE REDUCTASE (EC I_7_99_4)
 I_7_99_4 7640 *Klebsiella pneumoniae* NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 7641 *Klebsiella pneumoniae* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 7642 *Klebsiella pneumoniae* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 7643 *Klebsiella pneumoniae* NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 7644 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 7645 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 7646 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 7647 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE 2 ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 7648 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 7649 *Klebsiella pneumoniae* RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 8781 *Klebsiella pneumoniae* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 8782 *Klebsiella pneumoniae* NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 4403 *Haemophilus influenzae* HI0344 PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1295 *Haemophilus ducreyi* EC-napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1186 *Escherichia coli* narG RESPIRATORY NITRATE REDUCTASE I ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1187 *Escherichia coli* narH RESPIRATORY NITRATE REDUCTASE I BETA CHAIN (EC I_7_99_4)
 I_7_99_4 1188 *Escherichia coli* narJ NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 1189 *Escherichia coli* narI RESPIRATORY NITRATE REDUCTASE I GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 4919 *Escherichia coli* narV RESPIRATORY NITRATE REDUCTASE 2 GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 4920 *Escherichia coli* narW NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 4921 *Escherichia coli* narY NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 4922 *Escherichia coli* narZ NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 5339 *Escherichia coli* napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 1723 *Corynebacterium diphtheriae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1724 *Corynebacterium diphtheriae* NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 1725 *Corynebacterium diphtheriae* NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_4 1726 *Corynebacterium diphtheriae* NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 1335 *Campylobacter jejuni* napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 7385 *Bordetella bronchiseptica* PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC I_7_99_4)
 I_7_99_4 332 *Bacillus subtilis* nasC ASSIMILATORY NITRATE REDUCTASE CATALYTIC SUBUNIT (EC I_7_99_4)
 I_7_99_4 3720 *Bacillus subtilis* narI NITRATE REDUCTASE GAMMA CHAIN (EC I_7_99_4)
 I_7_99_4 3721 *Bacillus subtilis* narJ NITRATE REDUCTASE DELTA CHAIN (EC I_7_99_4)
 I_7_99_4 3722 *Bacillus subtilis* narH NITRATE REDUCTASE BETA CHAIN (EC I_7_99_4)
 I_7_99_4 3723 *Bacillus subtilis* narG NITRATE REDUCTASE ALPHA CHAIN (EC I_7_99_4)
 I_7_99_5 6038 *Yersinia pseudotuberculosis* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)

I_7_99_5 574 *Yersinia pestis* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 1499 *Yersinia pestis* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 6433 *Vibrio cholerae* El Tor N16961 ORF03396 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 501 *Streptococcus pneumoniae* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 593 *Salmonella typhimurium* metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 2485 *Salmonella typhi* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 4529 *Salmonella paratyphi* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 2037 *Salmonella enteritidis* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 3308 *Pseudomonas aeruginosa* metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 1323 *Pasteurella multocida* metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 1816 *Neisseria gonorrhoeae* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 7488 *Klebsiella pneumoniae* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 6620 *Haemophilus influenzae* HI1444 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 3839 *Escherichia coli* metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 1260 *Corynebacterium diphtheriae* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 2911 *Campylobacter jejuni* metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 1125 *Bordetella pertussis* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 4811 *Bordetella pertussis* 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_5 8084 *Bordetella bronchiseptica* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC I_7_99_5)
 I_7_99_6 356 *Pseudomonas aeruginosa* nosZ NITROUS-OXIDE REDUCTASE (EC I_7_99_6)
 I_7_99_6 1634 *Neisseria gonorrhoeae* NITROUS-OXIDE REDUCTASE (EC I_7_99_6)
 I_7_99_6 1635 *Neisseria gonorrhoeae* NITROUS-OXIDE REDUCTASE (EC I_7_99_6)
 I_7_99_7 1406 *Pseudomonas aeruginosa* norB NITRIC-OXIDE REDUCTASE SUBUNIT B (EC I_7_99_7)
 I_7_99_7 7666 *Pseudomonas aeruginosa* norC nitric-oxide reductase (EC I_7_99_7) cytochrome c chain - *Pseudomonas aeruginosa*
 I_7_99_7 208 *Neisseria gonorrhoeae* NITRIC-OXIDE REDUCTASE SUBUNIT B (EC I_7_99_7) cytochrome c chain
 I_7_99_7 1821 *Corynebacterium diphtheriae* nitric-oxide reductase (EC I_7_99_7) cytochrome c chain
 I_7_99_7 2152 *Corynebacterium diphtheriae* NITRIC-OXIDE REDUCTASE SUBUNIT B (EC I_7_99_7)
 I_8_1_2 4928 *Yersinia pseudotuberculosis* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)
 I_8_1_2 6905 *Yersinia pseudotuberculosis* EC-cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)
 I_8_1_2 6906 *Yersinia pseudotuberculosis* EC-cysI SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC I_8_1_2)
 I_8_1_2 1033 *Yersinia pestis* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)
 I_8_1_2 1578 *Yersinia pestis* EC-cysI SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC I_8_1_2)
 I_8_1_2 1579 *Yersinia pestis* EC-cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)
 I_8_1_2 4259 *Vibrio cholerae* El Tor N16961 ORF00539 SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)
 I_8_1_2 4260 *Vibrio cholerae* El Tor N16961 ORF00541 SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC I_8_1_2)
 I_8_1_2 1443 *Staphylococcus aureus* EC-cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC I_8_1_2)

1_8_1_2 3708 *Salmonella typhimurium* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5996 *Salmonella typhimurium* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5997 *Salmonella typhimurium* cysI SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5998 *Salmonella typhimurium* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5999 *Salmonella typhimurium* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6000 *Salmonella typhimurium* cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 1664 *Salmonella typhi* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 1733 *Salmonella typhi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 2607 *Salmonella typhi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 2011 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6281 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6282 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6283 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6284 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6285 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6286 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 6287 *Salmonella paratyphi* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 726 *Salmonella enteritidis* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 3272 *Salmonella enteritidis* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 582 *Salmonella dublin* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 3712 *Salmonella dublin* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 4125 *Saccharomyces cerevisiae* MET10 SULFITE REDUCTASE (NADPH) FLAVOPROTEIN COMPONENT (EC 1_8_1_2)
 1_8_1_2 857 *Pseudomonas aeruginosa* PA4513 SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 7534 *Pseudomonas aeruginosa* PA3435 SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 890 *Neisseria gonorrhoeae* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 892 *Neisseria gonorrhoeae* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 893 *Neisseria gonorrhoeae* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 894 *Neisseria gonorrhoeae* SULFITE REDUCTASE (NADPH) (EC 1_8_1_2)
 1_8_1_2 4102 *Klebsiella pneumoniae* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 4730 *Klebsiella pneumoniae* SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 4731 *Klebsiella pneumoniae* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)

1_8_1_2 4732 *Klebsiella pneumoniae* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5642 *Escherichia coli* cysI SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5643 *Escherichia coli* cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 5662 *Escherichia coli* b2790 SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 2495 *Bordetella pertussis* EC-cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 8556 *Bordetella bronchiseptica* EC-cysJ SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 3338 *Bacillus subtilis* yvgQ SULFITE REDUCTASE (NADPH) HEMOPROTEIN BETA-COMPONENT (EC 1_8_1_2)
 1_8_1_2 3339 *Bacillus subtilis* yvgR SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_7_1 6122 *Saccharomyces cerevisiae* ECM17 SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_7_1 556 *Pseudomonas aeruginosa* cysI SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_7_1 5599 *Pseudomonas aeruginosa* PA4130 SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_7_1 2321 *Bordetella pertussis* SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_7_1 2322 *Bordetella pertussis* SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_7_1 9757 *Bordetella bronchiseptica* SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_99_2 5628 *Pseudomonas aeruginosa* PA2298 ADENYLYL-SULPHATE REDUCTASE ALFA-SUBUNIT (EC 1_8_99_2)
 1_8_99_2 8245 *Pseudomonas aeruginosa* PA2297 ADENYLYLSULPHATE REDUCTASE BETA-SUBUNIT (EC 1_8_99_2)
 1_8_99_2 434 *Clostridium acetobutylicum* 13829432_C3_89 ADENYLYLSULPHATE REDUCTASE BETA-SUBUNIT (EC 1_8_99_2)
 1_8_99_2 435 *Clostridium acetobutylicum* 24254662_C2_83 ADENYLYL-SULPHATE REDUCTASE ALFA-SUBUNIT (EC 1_8_99_2)
 1_8_99_3 3722 *Yersinia pestis* EC-yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 5181 *Vibrio cholerae* El Tor N16961 ORF01748 SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 2916 *Salmonella typhimurium* yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 1311 *Salmonella typhi* SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 5860 *Salmonella paratyphi* SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 6761 *Pseudomonas aeruginosa* PA2608 SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 1416 *Pasteurella multocida* EC-yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 2969 *Klebsiella pneumoniae* SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 18975 *Haemophilus influenzae* H11371 SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 436 *Haemophilus ducreyi* EC-yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_8_99_3 4710 *Escherichia coli* yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_9_3_2 1909 *Pseudomonas aeruginosa* nirS NITRITE REDUCTASE PRECURSOR (EC 1_9_3_2)
 1_9_3_2 6070 *Pseudomonas aeruginosa* nirN NITRITE REDUCTASE PRECURSOR (EC 1_9_3_2)
 2_1_1_10 252 *Escherichia coli* yagD HOMOCYSTEINE S-METHYLTRANSFERASE (EC 2_1_1_10)
 2_1_1_10 242 *Bacillus subtilis* ybgG HOMOCYSTEINE S-METHYLTRANSFERASE (EC 2_1_1_10)
 2_1_1_100 2200 *Saccharomyces cerevisiae* STE14 PROTEIN-S ISOPRENYLCYSTEINE O-METHYLTRANSFERASE (EC 2_1_1_100)
 2_1_1_104 703 *Streptococcus pyogenes* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 415 *Streptococcus pneumoniae* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)

2_1_1_104 780 *Streptococcus mutans* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 863 *Staphylococcus aureus* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 3498 *Pseudomonas aeruginosa* PA1200 CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 8233 *Pseudomonas aeruginosa* PA1402 CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 1581 *Porphyromonas gingivalis* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 911 *Neisseria gonorrhoeae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 3179 *Mycobacterium tuberculosis* Rv0187 CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 4631 *Mycobacterium tuberculosis* Rv1220c CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 1126 *Mycobacterium leprae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 574 *Mycobacterium bovis* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 4619 *Klebsiella pneumoniae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 4620 *Klebsiella pneumoniae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 4621 *Klebsiella pneumoniae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 1441 *Enterococcus faecium* (DOE) CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 1583 *Enterococcus faecalis* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 812 *Corynebacterium diphtheriae* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 3073 *Clostridium difficile* BS-yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 2090 *Clostridium acetobutylicum* 24508500_F2_7 CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_104 2729 *Bacillus subtilis* yrrM CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_107 6879 *Yersinia pseudotuberculosis* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 7867 *Yersinia pseudotuberculosis* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 1480 *Yersinia pestis* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 1594 *Yersinia pestis* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 4929 *Yersinia pestis* EC-cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 4002 *Vibrio cholerae* El Tor N16961 ORF00169 PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 5188 *Vibrio cholerae* El Tor N16961 ORF01755 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 1665 *Staphylococcus aureus* EC-cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 3208 *Staphylococcus aureus* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 3397 *Staphylococcus aureus* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 101 *Salmonella typhimurium* cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 4167 *Salmonella typhimurium* hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 5157 *Salmonella typhimurium* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 925 *Salmonella typhi* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 2314 *Salmonella typhi* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 5041 *Salmonella typhi* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 2128 *Salmonella paratyphi* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 215 *Salmonella enteritidis* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)

2_1_1_107 2107 *Salmonella dublin* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 2432 *Salmonella dublin* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 6925 *Saccharomyces cerevisiae* MET1 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 337 *Pseudomonas aeruginosa* cobA UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 4900 *Pseudomonas aeruginosa* PA5258 PUTATIVE UROPORPHYRIN-III C-
 METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 6068 *Pseudomonas aeruginosa* PA0510 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 6759 *Pseudomonas aeruginosa* cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 815 *Pasteurella multocida* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE
 (EC 2_1_1_107)
 2_1_1_107 1416 *Neisseria gonorrhoeae* EC-hemX PUTATIVE UROPORPHYRIN-III C-
 METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 1821 *Mycobacterium tuberculosis* cysG2 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 2199 *Mycobacterium tuberculosis* cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 336 *Mycobacterium leprae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 487 *Mycobacterium bovis* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 2177 *Mycobacterium bovis* EC-cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 951 *Klebsiella pneumoniae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 3243 *Klebsiella pneumoniae* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 5822 *Klebsiella pneumoniae* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 5825 *Klebsiella pneumoniae* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 6330 *Klebsiella pneumoniae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 8382 *Klebsiella pneumoniae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 17041 *Haemophilus influenzae* tn[G32]12196 PUTATIVE UROPORPHYRIN-III C-
 METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 20668 *Haemophilus influenzae* HI0603 PUTATIVE UROPORPHYRIN-III C-
 METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 501 *Haemophilus ducreyi* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE
 (EC 2_1_1_107)
 2_1_1_107 3286 *Escherichia coli* cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 6201 *Escherichia coli* hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 605 *Enterococcus faecium* (DOE) PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE
 (EC 2_1_1_107)
 2_1_1_107 898 *Corynebacterium diphtheriae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 2211 *Corynebacterium diphtheriae* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107)
 2_1_1_107 916 *Clostridium difficile* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) /
 UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 441 *Clostridium acetobutylicum* 34181553_C1_70 UROPORPHYRIN-III C-
 METHYLTRANSFERASE (EC 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 231 *Chlamydia pneumoniae* AR39 CP0231 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC
 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)

2_1_1_107 474 *Chlamydia pneumoniae* CWL029 CPn0522 UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 274 *Bordetella pertussis* UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 2143 *Bordetella pertussis* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 2171 *Bordetella pertussis* EC-cysG UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_107 4506 *Bordetella pertussis* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 5282 *Bordetella bronchiseptica* PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 9596 *Bordetella bronchiseptica* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 329 *Bacillus subtilis* nasF UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / UROPORPHYRINOGEN-III SYNTHASE (EC 4_2_1_75)
 2_1_1_107 1562 *Bacillus subtilis* ylnD UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_107 1564 *Bacillus subtilis* ylnF UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107) / PRECORRIN-2 OXIDASE (EC 1_-_-_-) / FERROCHELATASE (EC 4_99_1_-)
 2_1_1_113 6162 *Yersinia pseudotuberculosis* MODIFICATION METHYLASE CFR9I (EC 2_1_1_113)
 2_1_1_113 4697 *Yersinia pestis* MODIFICATION METHYLASE MVAI (EC 2_1_1_113)
 2_1_1_113 1760 *Streptococcus equi* MODIFICATION METHYLASE CFR9I (EC 2_1_1_113)
 2_1_1_113 629 *Helicobacter pylori* J99tr|Q9ZLF1 MODIFICATION METHYLASE CFRBI (EC 2_1_1_113)
 2_1_1_113 3474 *Clostridium difficile* MODIFICATION METHYLASE CFR9I (EC 2_1_1_113)
 2_1_1_114 1883 *Saccharomyces cerevisiae* COQ3 HEXAPRENYLDIHYDROXYBENZOATE METHYLTRANSFERASE PRECURSOR (EC 2_1_1_114)
 2_1_1_130 978 *Salmonella typhimurium* cbil PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 2587 *Salmonella typhi* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 2113 *Salmonella paratyphi* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 3656 *Salmonella dublin* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 3113 *Pseudomonas aeruginosa* cobI PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 305 *Porphyromonas gingivalis* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 1221 *Mycobacterium tuberculosis* cobI PRECORRIN-2 C-20-METHYLTRANSFERASE (EC 2_1_1_130) / PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_130 6271 *Klebsiella pneumoniae* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_130 918 *Clostridium difficile* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130) / CBIK PROTEIN
 2_1_1_130 2058 *Clostridium acetobutylicum* 19532655_C1_23 PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_131 975 *Salmonella typhimurium* cbIH PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 2590 *Salmonella typhi* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 6928 *Salmonella paratyphi* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 3261 *Salmonella enteritidis* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 3111 *Pseudomonas aeruginosa* cobJ PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 591 *Porphyromonas gingivalis* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 1701 *Porphyromonas gingivalis* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 1221 *Mycobacterium tuberculosis* cobI PRECORRIN-2 C-20-METHYLTRANSFERASE (EC 2_1_1_130) / PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 2413 *Mycobacterium bovis* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 6265 *Klebsiella pneumoniae* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 6266 *Klebsiella pneumoniae* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 1524 *Corynebacterium diphtheriae* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 920 *Clostridium difficile* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_131 2055 *Clostridium acetobutylicum* 34027217_C2_28 PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_132 971 *Salmonella typhimurium* cbIE PRECORRIN-6Y C5,15-METHYLTRANSFERASE (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 218 *Salmonella typhi* PRECORRIN-6Y C5,15-METHYLTRANSFERASE (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 219 *Salmonella typhi* PRECORRIN-6Y C5,15-METHYLTRANSFERASE (DECARBOXYLATING) (EC 2_1_1_132)

2_1_1_132 1448 *Salmonella enteritidis* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 5846 *Pseudomonas aeruginosa* cobL PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 1193 *Mycobacterium tuberculosis* cobL PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 2419 *Mycobacterium bovis* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 2443 *Klebsiella pneumoniae* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 1521 *Corynebacterium diphtheriae* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 924 *Clostridium difficile* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_132 4429 *Clostridium acetobutylicum* PRECORRIN-6Y C5,15-METHYLTRANSFERASE
 (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_133 973 *Salmonella typhimurium* cbiF PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 217 *Salmonella typhi* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 2596 *Salmonella enteritidis* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 1601 *Salmonella dublin* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 295 *Pseudomonas aeruginosa* cobM PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 6260 *Klebsiella pneumoniae* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 1522 *Corynebacterium diphtheriae* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_133 922 *Clostridium difficile* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_14 5982 *Yersinia pseudotuberculosis* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1748 *Yersinia pestis* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 5502 *Vibrio cholerae* El Tor N16961 ORF02177 5-
 METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE METHYLTRANSFERASE (EC
 2_1_1_14)
 2_1_1_14 500 *Streptococcus pneumoniae* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1335 *Streptococcus mutans* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1371 *Streptococcus mutans* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3357 *Staphylococcus aureus* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 5822 *Salmonella typhimurium* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1635 *Salmonella typhi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE
 METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 146 *Salmonella paratyphi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 147 *Salmonella paratyphi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 733 *Salmonella paratyphi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 734 *Salmonella paratyphi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 735 *Salmonella paratyphi* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 2443 *Salmonella enteritidis* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1686 *Salmonella dublin* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE
 METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 6919 *Saccharomyces cerevisiae* MET6 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 2236 *Pseudomonas aeruginosa* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)

2_1_1_14 1435 *Pasteurella multocida* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 20307 *Neurospora crassa* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 20371 *Neurospora crassa* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 145 *Neisseria gonorrhoeae* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 2272 *Mycobacterium tuberculosis* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1727 *Mycobacterium leprae* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 952 *Mycobacterium bovis* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 2421 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3971 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3972 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3973 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3974 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 4275 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 6192 *Klebsiella pneumoniae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 14710 *Haemophilus influenzae* H11702 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 6587 *Escherichia coli* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1557 *Enterococcus faecalis* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 2042 *Corynebacterium diphtheriae* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 305 *Chlamydia pneumoniae* AR39 CP0305 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 630 *Chlamydia pneumoniae* AR39 CP0630 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 129 *Chlamydia pneumoniae* CWL029 yxjG_1 5-
 METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE METHYLTRANSFERASE (EC
 2_1_1_14)
 2_1_1_14 405 *Chlamydia pneumoniae* CWL029 yxjG_2 5-
 METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE METHYLTRANSFERASE (EC
 2_1_1_14)
 2_1_1_14 2511 *Campylobacter jejuni* metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 555 *Bordetella pertussis* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 6444 *Bordetella bronchiseptica* EC-metE 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 1319 *Bacillus subtilis* metC 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3888 *Bacillus subtilis* yxjH 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_14 3889 *Bacillus subtilis* yxjG 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--
 HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_16 2534 *Saccharomyces cerevisiae* OPI3 METHYLENE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE
 (EC 2_1_1_16)
 2_1_1_34 7362 *Yersinia pseudotuberculosis* EC-spoU TRNA (GUANOSINE-2'-O-)-METHYLTRANSFERASE
 (EC 2_1_1_34)

2_1_1_34 2304 *Yersinia pestis* EC-spoU TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 6031 *Salmonella typhimurium* spoU TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 2095 *Salmonella typhi* TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 185 *Salmonella paratyphi* TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 4134 *Salmonella dublin* TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 7955 *Klebsiella pneumoniae* TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 3571 *Escherichia coli* spoU TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_34 680 *Borrelia burgdorferi* BB0052 TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_35 7315 *Yersinia pseudotuberculosis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 7649 *Yersinia pseudotuberculosis* EC-trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 705 *Yersinia pestis* EC-trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4065 *Yersinia pestis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 688 *Vibrio cholerae* El Tor N16961 ORF03100 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4038 *Vibrio cholerae* El Tor N16961 ORF00217 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 7429 *Vibrio cholerae* El Tor N16961ORFA00670 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 217 *Streptococcus pyogenes* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1768 *Streptococcus pyogenes* BS-yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 361 *Streptococcus pneumoniae* BS-yefA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 570 *Streptococcus pneumoniae* BS-yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 759 *Streptococcus mutans* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1271 *Streptococcus mutans* BS-yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1612 *Streptococcus equi* BS-yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1777 *Streptococcus equi* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3206 *Staphylococcus aureus* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 850 *Salmonella typhimurium* trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2784 *Salmonella typhimurium* ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4199 *Salmonella typhimurium* ybfF TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2162 *Salmonella typhi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2274 *Salmonella typhi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4480 *Salmonella typhi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3522 *Salmonella paratyphi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3560 *Salmonella paratyphi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3911 *Salmonella paratyphi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3912 *Salmonella paratyphi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3913 *Salmonella paratyphi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2238 *Salmonella enteritidis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 5275 *Salmonella enteritidis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1509 *Salmonella dublin* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2517 *Salmonella dublin* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3929 *Salmonella dublin* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3930 *Salmonella dublin* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1008 *Pseudomonas aeruginosa* ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3222 *Pseudomonas aeruginosa* trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1506 *Porphyromonas gingivalis* BS-yefA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 826 *Pasteurella multocida* trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 950 *Pasteurella multocida* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1140 *Pasteurella multocida* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 450 *Neisseria gonorrhoeae* EC-trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1498 *Mycobacterium tuberculosis* Rv2689c TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2716 *Mycobacterium bovis* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1693 *Klebsiella pneumoniae* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1694 *Klebsiella pneumoniae* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)

2_1_1_35 3467 *Klebsiella pneumoniae* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3806 *Klebsiella pneumoniae* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4384 *Haemophilus influenzae* HI0333 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 5418 *Haemophilus influenzae* HI0848 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 19855 *Haemophilus influenzae* HI0958 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 481 *Haemophilus ducreyi* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 737 *Haemophilus ducreyi* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1187 *Haemophilus ducreyi* EC-trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 826 *Escherichia coli* b0859 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 5658 *Escherichia coli* ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 6270 *Escherichia coli* trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1653 *Enterococcus faecium* (DOE) EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 500 *Enterococcus faecalis* BS-yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2455 *Enterococcus faecalis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 1991 *Corynebacterium diphtheriae* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 25 *Clostridium difficile* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 3331 *Clostridium difficile* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 358 *Clostridium acetobutylicum* 36134392_C3_152 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 2418 *Clostridium acetobutylicum* 24628558_C3_18 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 712 *Chlamydia trachomatis* D/UW-3/Cx BS-yefA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 981 *Chlamydia pneumoniae* AR39 CP0981 TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 817 *Chlamydia pneumoniae* CWL029 ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 388 *Campylobacter jejuni* trmA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 4385 *Bordetella pertussis* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 5322 *Bordetella bronchiseptica* EC-ygcA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 674 *Bacillus subtilis* yefA TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_35 802 *Bacillus subtilis* yfjO TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_41 4901 *Saccharomyces cerevisiae* ERG6 DELTA(24)-STEROL C-METHYLTRANSFERASE (EC 2_1_1_41)
 2_1_1_48 841 *Staphylococcus aureus* RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_48 5781 *Mycobacterium tuberculosis* Rv1988 RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_48 2625 *Enterococcus faecium* (DOE) RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_48 1041 *Enterococcus faecalis* trjQ54945 RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_48 1086 *Clostridium difficile* trjQ9WW64 RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_51 5798 *Vibrio cholerae* El Tor N16961. ORF02531 RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 5462 *Salmonella typhimurium* rrmA RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 1593 *Salmonella typhi* RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 2386 *Salmonella dublin* RIBOSOMAL RNA LARGE SUBUNIT METHYLTRANSFERASE A (EC 2_1_1_51)
 2_1_1_51 7223 *Klebsiella pneumoniae* RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 5115 *Escherichia coli* yebH RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 2311 *Enterococcus faecalis* EC-yebH RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_51 3894 *Bacillus subtilis* yxjB RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_52 6485 *Yersinia pseudotuberculosis* EC-yjtT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 6812 *Yersinia pseudotuberculosis* EC-ygiO RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)

2_1_1_52 421 *Yersinia pestis* EC-yjiT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 3940 *Yersinia pestis* EC-ygiO RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 4482 *Vibrio cholerae* El Tor N16961 ORF00850 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1294 *Streptococcus pyogenes* BS-ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1030 *Streptococcus pneumoniae* BS-ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 555 *Streptococcus mutans* BS-ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1327 *Streptococcus equi* BS-ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1927 *Salmonella typhimurium* yjiT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 3674 *Salmonella typhimurium* ygiO RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1680 *Salmonella typhi* RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 2664 *Salmonella typhi* RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 4544 *Salmonella dublin* PUTATIVE RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE D (EC 2_1_1_52)
 2_1_1_52 6423 *Pseudomonas aeruginosa* PA4627 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 7033 *Pseudomonas aeruginosa* PA4617 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1751 *Pasteurella multocida* EC-yjiT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 4887 *Klebsiella pneumoniae* RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1384 *Helicobacter pylori* J99tr|Q9ZJB6 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 7230 *Haemophilus influenzae* HI0012 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 1390 *Haemophilus ducreyi* EC-yjiT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 5821 *Escherichia coli* ygiO RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 6468 *Escherichia coli* yjiT RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 756 *Enterococcus faecalis* BS-ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 562 *Campylobacter jejuni* Cj0495 RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_52 106 *Bacillus subtilis* ybxB RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_64 5749 *Yersinia pseudotuberculosis* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 347 *Yersinia pestis* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2706 *Yersinia pestis* EC-yafE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 5082 *Vibrio cholerae* El Tor N16961 ORF01630 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2308 *Staphylococcus aureus* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1731 *Salmonella typhimurium* ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1804 *Salmonella typhimurium* yafE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)

2_1_1_64 442 *Salmonella typhi* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1082 *Salmonella typhi* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2337 *Salmonella paratyphi* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 6873 *Salmonella paratyphi* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 697 *Salmonella enteritidis* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 3902 *Salmonella dublin* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 600 *Rickettsia prowazekii* RP622 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 589 *Pseudomonas aeruginosa* PA3119 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2405 *Pseudomonas aeruginosa* ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 4890 *Pseudomonas aeruginosa* PA0547 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 5416 *Pseudomonas aeruginosa* PA1216 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 638 *Porphyromonas gingivalis* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 276 *Pasteurella multocida* ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1480 *Neisseria gonorrhoeae* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2384 *Mycobacterium tuberculosis* ubiE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 432 *Mycobacterium bovis* EC-yigO 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2467 *Klebsiella pneumoniae* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 3487 *Klebsiella pneumoniae* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1363 *Helicobacter pylori* J99tr/Q9ZJD6 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 495 *Haemophilus ducreyi* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 204 *Escherichia coli* yafE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2181 *Escherichia coli* ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 980 *Enterococcus faecium* (DOE) EC-yigO 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 735 *Corynebacterium diphtheriae* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 865 *Corynebacterium diphtheriae* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1460 *Corynebacterium diphtheriae* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 1272 *Clostridium acetobutylicum* 286687_C1_46 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 2240 *Clostridium acetobutylicum* 36600002_C1_28 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 131 *Chlamydia trachomatis* D/UW-3/Cx CT133 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 580 *Chlamydia pneumoniae* AR39 CP0580 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 199 *Bordetella pertussis* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 393 *Bordetella pertussis* EC-yafE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)

2_1_1_64 1459 *Bordetella pertussis* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 6654 *Bordetella bronchiseptica* EC-yafE 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 7004 *Bordetella bronchiseptica* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 8762 *Bordetella bronchiseptica* EC-ubiG 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_64 317 *Bacillus subtilis* ycgJ 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_72 5839 *Yersinia pseudotuberculosis* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 7260 *Yersinia pseudotuberculosis* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 555 *Yersinia pestis* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 2847 *Yersinia pestis* O68789 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 5849 *Yersinia pestis* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 6375 *Vibrio cholerae* El Tor N16961 ORF03322 ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 220 *Ureaplasma urealyticum* hsdM-I TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 617 *Ureaplasma urealyticum* UU477 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 443 *Treponema pallidum* TP0810 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1419 *Streptococcus pyogenes* BS-ytxK MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 1144 *Streptococcus pneumoniae* EC-hsdM TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 1581 *Streptococcus pneumoniae* TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 1697 *Streptococcus pneumoniae* EC-yhdJ MODIFICATION METHYLASE (EC 2_1_1_72)
 2_1_1_72 320 *Streptococcus mutans* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 362 *Streptococcus mutans* EC-yhdJ ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 430 *Streptococcus mutans* BS-ytxK MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 585 *Streptococcus equi* BS-ytxK MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 1341 *Streptococcus equi* MODIFICATION METHYLASE STSI (EC 2_1_1_72)
 2_1_1_72 1645 *Streptococcus equi* EC-yhdJ ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1727 *Streptococcus equi* SITE-SPECIFIC DNA-METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1816 *Streptococcus equi* MODIFICATION METHYLASE PSTI (EC 2_1_1_72)
 2_1_1_72 2700 *Staphylococcus aureus* BS-ytxK MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 3747 *Staphylococcus aureus* MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 527 *Salmonella typhimurium* TYPE I RESTRICTION ENZYME STYSJI M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2718 *Salmonella typhimurium* mod TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 3372 *Salmonella typhimurium* hsdT TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 5379 *Salmonella typhimurium* dam ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 5909 *Salmonella typhimurium* yhdJ ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 6212 *Salmonella typhimurium* TYPE IIS RESTRICTION ENZYME (EC 3_1_21_4) (EC 2_1_1_72)
 2_1_1_72 6341 *Salmonella typhimurium* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 6717 *Salmonella typhimurium* ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 163 *Salmonella typhi* ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1156 *Salmonella typhi* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 2710 *Salmonella typhi* PUTATIVE ADENINE-SPECIFIC METHYLASE (EC 2_1_1_72)
 2_1_1_72 3859 *Salmonella typhi* TYPE I RESTRICTION ENZYME STYSPI M PROTEIN (EC 2_1_1_72)
 2_1_1_72 3860 *Salmonella typhi* TYPE I RESTRICTION ENZYME STYSPI M PROTEIN (EC 2_1_1_72)
 2_1_1_72 5415 *Salmonella typhi* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 5627 *Salmonella typhi* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1115 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME STYSPI M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2610 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2611 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 3050 *Salmonella paratyphi* MODIFICATION METHYLASE (EC 2_1_1_72)
 2_1_1_72 3154 *Salmonella paratyphi* DNA ADENINE METHYLASE (EC 2_1_1_72)

2_1_1_72 3727 *Salmonella paratyphi* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 3728 *Salmonella paratyphi* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 3729 *Salmonella paratyphi* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 5517 *Salmonella paratyphi* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 6051 *Salmonella paratyphi* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1072 *Salmonella enteritidis* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 2583 *Salmonella enteritidis* MODIFICATION METHYLASE (EC 2_1_1_72)
 2_1_1_72 5105 *Salmonella enteritidis* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 342 *Salmonella dublin* RETRON EC67 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 369 *Salmonella dublin* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 1612 *Salmonella dublin* ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1673 *Salmonella dublin* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 1740 *Salmonella dublin* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 2096 *Salmonella dublin* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 866 *Pasteurella multocida* dam ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1632 *Pasteurella multocida* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 697 *Neisseria gonorrhoeae* O30358 MODIFICATION METHYLASE HPHI(A) (EC 2_1_1_72)
 2_1_1_72 924 *Neisseria gonorrhoeae* EC-yhdJ ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1278 *Neisseria gonorrhoeae* Q9ZIE8 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 1550 *Neisseria gonorrhoeae* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 2037 *Neisseria gonorrhoeae* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 2038 *Neisseria gonorrhoeae* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 634 *Mycoplasma pneumoniae* mteI MODIFICATION METHYLASE ECOR1 (EC 2_1_1_72)
 2_1_1_72 1405 *Mycoplasma genitalium* MG184 MODIFICATION METHYLASE ECOR1 (EC 2_1_1_72)
 2_1_1_72 2868 *Mycobacterium tuberculosis* Rv3263 MODIFICATION METHYLASE ECO57I (EC 2_1_1_72)
 2_1_1_72 2933 *Mycobacterium leprae* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2934 *Mycobacterium leprae* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 3404 *Mycobacterium leprae* MODIFICATION METHYLASE ECO57I (EC 2_1_1_72)
 2_1_1_72 3442 *Mycobacterium bovis* MODIFICATION METHYLASE ECO57I (EC 2_1_1_72)
 2_1_1_72 5748 *Klebsiella pneumoniae* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 6704 *Klebsiella pneumoniae* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 6705 *Klebsiella pneumoniae* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 8631 *Klebsiella pneumoniae* ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 30 *Helicobacter pylori* HP0593 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 270 *Helicobacter pylori* HP0850 TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 326 *Helicobacter pylori* HP0910 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 744 *Helicobacter pylori* HP1352 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 759 *Helicobacter pylori* HP1367 MODIFICATION METHYLASE MBOII (EC 2_1_1_72)
 2_1_1_72 762 *Helicobacter pylori* HP1370 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 792 *Helicobacter pylori* HP1403 TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 1010 *Helicobacter pylori* HP0050 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1049 *Helicobacter pylori* HP0092 SITE-SPECIFIC DNA-METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1207 *Helicobacter pylori* HP0260 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)

2_1_1_72 1209 *Helicobacter pylori* HP0262 site-specific DNA-methyltransferase (adenine-specific) (EC 2_1_1_72) (HpaI)
 2_1_1_72 1210 *Helicobacter pylori* HP0263 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1385 *Helicobacter pylori* HP0463 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1744 *Helicobacter pylori* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 43 *Helicobacter pylori* J99 jhp0043 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 45 *Helicobacter pylori* J99 jhp0045 TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 88 *Helicobacter pylori* J99tr|Q9ZMY0 SITE-SPECIFIC DNA-METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 168 *Helicobacter pylori* J99tr|Q9ZMQ4 MODIFICATION METHYLASE LLAI (EC 2_1_1_72), second component
 2_1_1_72 249 *Helicobacter pylori* J99tr|Q9ZMH6 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 251 *Helicobacter pylori* J99tr|Q9ZMH4 site-specific DNA-methyltransferase (adenine-specific) (EC 2_1_1_72) (HpaI)
 2_1_1_72 253 *Helicobacter pylori* J99tr|Q9ZMH2 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 754 *Helicobacter pylori* J99 jhp0756 MODIFICATION METHYLASE (EC 2_1_1_72)
 2_1_1_72 785 *Helicobacter pylori* J99tr|Q9ZKZ6 TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 843 *Helicobacter pylori* J99tr|Q9ZKT9 DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1258 *Helicobacter pylori* J99tr|Q9ZJN4 ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 1273 *Helicobacter pylori* J99tr|Q9ZJM2 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 1285 *Helicobacter pylori* J99tr|Q9ZJL0 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 1399 *Helicobacter pylori* J99 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 1411 *Helicobacter pylori* J99 hsdM_3 TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 476 *Haemophilus influenzae* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 477 *Haemophilus influenzae* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 4114 *Haemophilus influenzae* HI0209 ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 4123 *Haemophilus influenzae* HI0215 TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 4125 *Haemophilus influenzae* TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 11594 *Haemophilus influenzae* HI1392 MODIFICATION METHYLASE HINDIII (EC 2_1_1_72)
 2_1_1_72 13577 *Haemophilus influenzae* HI0513 MODIFICATION METHYLASE HINCII (EC 2_1_1_72)
 2_1_1_72 16045 *Haemophilus influenzae* HI1056 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 544 *Haemophilus ducreyi* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 545 *Haemophilus ducreyi* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 781 *Haemophilus ducreyi* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_72 1462 *Haemophilus ducreyi* TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 3187 *Escherichia coli* yhdJ ADENINE-SPECIFIC METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 5982 *Escherichia coli* dam ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 6453 *Escherichia coli* hsdM TYPE I RESTRICTION ENZYME ECOK I M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2709 *Enterococcus faecium* (DOE) MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_72 3968 *Enterococcus faecium* (DOE) TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 3265 *Enterococcus faecalis* MODIFICATION METHYLASE MUNI (EC 2_1_1_72)
 2_1_1_72 1717 *Corynebacterium diphtheriae* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT ENZYME MOD (EC 2_1_1_72)

2_1_1_72 1464 *Clostridium difficile* MODIFICATION METHYLASE BSTVI (EC 2_1_1_72)
 2_1_1_72 1878 *Clostridium difficile* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 26 *Clostridium acetobutylicum* 790937_C1_164 MODIFICATION METHYLASE ECOS7I (EC 2_1_1_72)
 2_1_1_72 201 *Clostridium acetobutylicum* 4105427_C3_133 MODIFICATION METHYLASE CVIBI (EC 2_1_1_72)
 2_1_1_72 1952 *Clostridium acetobutylicum* 25787767_C2_40 MODIFICATION METHYLASE BSTVI (EC 2_1_1_72)
 2_1_1_72 2038 *Campylobacter jejuni* Cj1553c TYPE I RESTRICTION ENZYME ECOR124II M PROTEIN (EC 2_1_1_72)
 2_1_1_72 2142 *Campylobacter jejuni* Cj0208 MODIFICATION METHYLASE NLAI (EC 2_1_1_72)
 2_1_1_72 726 *Bordetella pertussis* EC-ycjD TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI5I ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 9331 *Bordetella bronchiseptica* ADENINE-SPECIFIC DNA METHYLTRANSFERASE (EC 2_1_1_72)
 2_1_1_72 9387 *Bordetella bronchiseptica* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME MOD (EC 2_1_1_72)
 2_1_1_72 610 *Bacillus subtilis* ydiS MODIFICATION METHYLASE LLADCHI B (EC 2_1_1_72)
 2_1_1_72 2942 *Bacillus subtilis* yxk MODIFICATION METHYLASE ACCI (EC 2_1_1_72)
 2_1_1_79 4807 *Yersinia pseudotuberculosis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 1131 *Yersinia pestis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 4948 *Vibrio cholerae* El Tor N16961 ORF01465 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2942 *Salmonella typhimurium* cdfA CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 4613 *Salmonella typhi* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 306 *Salmonella paratyphi* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2263 *Salmonella enteritidis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 3698 *Salmonella dublin* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2096 *Pseudomonas aeruginosa* PA5546 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 344 *Mycobacterium tuberculosis* cmaA2 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 2 (EC 2_1_1_79)
 2_1_1_79 2229 *Mycobacterium tuberculosis* mmaA2 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 3365 *Mycobacterium tuberculosis* umaA2 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 3867 *Mycobacterium tuberculosis* Rv3720 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 4969 *Mycobacterium tuberculosis* ufaA1 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 6034 *Mycobacterium tuberculosis* cmaA1 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 342 *Mycobacterium lepraetr*Q49807 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 2 (EC 2_1_1_79)
 2_1_1_79 1377 *Mycobacterium lepraetr*Q69515 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2413 *Mycobacterium leprae* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 497 *Mycobacterium bovis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 2 (EC 2_1_1_79)
 2_1_1_79 699 *Mycobacterium bovis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 2267 *Mycobacterium bovis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE 1 (EC 2_1_1_79)
 2_1_1_79 2531 *Mycobacterium bovis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)

2_1_1_79 3540 *Mycobacterium bovis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 3095 *Klebsiella pneumoniae* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 7385 *Klebsiella pneumoniae* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 1351 *Helicobacter pylori* HP0416 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 960 *Helicobacter pylori* J99trjQ9ZKG8 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 1620 *Escherichia coli* cfa CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 360 *Enterococcus faecium* (DOE) CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2775 *Enterococcus faecalis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 534 *Corynebacterium diphtheriae* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 1603 *Clostridium difficile* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 682 *Clostridium acetobutylicum* 428387_C2_97 CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 2480 *Campylobacter jejuni* cfa CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 3532 *Bordetella pertussis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_79 8675 *Bordetella bronchiseptica* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_98 3344 *Saccharomyces cerevisiae* DPH5 DIPHTHINE SYNTHASE (EC 2_1_1_98)
 2_1_2_11 7188 *Yersinia pseudotuberculosis* EC-panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 4152 *Yersinia pestis* EC-panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 4451 *Vibrio cholerae* El Tor N16961 ORF00814 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2396 *Staphylococcus aureus* EC-panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 1986 *Salmonella typhimurium* panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2468 *Salmonella typhi* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 5837 *Salmonella paratyphi* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2878 *Salmonella enteritidis* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2577 *Salmonella dublin* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 3568 *Saccharomyces cerevisiae* ECM31 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2174 *Pseudomonas aeruginosa* panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 8114 *Pseudomonas aeruginosa* PA1598 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 121 *Porphyromonas gingivalis* EC-panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 1188 *Neisseria gonorrhoeae* EC-panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 1063 *Mycobacterium tuberculosis* panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2306 *Mycobacterium leprae* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)

2_1_2_11 1049 *Mycobacterium bovis* EC-panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 1116 *Klebsiella pneumoniae* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE
 (EC 2_1_2_11)
 2_1_2_11 1117 *Klebsiella pneumoniae* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE
 (EC 2_1_2_11)
 2_1_2_11 462 *Helicobacter pylori* HP1058 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 370 *Helicobacter pylori* J99 panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 4341 *Escherichia coli* panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE
 (EC 2_1_2_11)
 2_1_2_11 3269 *Enterococcus faecium* (DOE) 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 1843 *Enterococcus faecalis* EC-panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2137 *Corynebacterium diphtheriae* 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 223 *Clostridium difficile* EC-panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 999 *Clostridium acetobutylicum* 789818_C3_54 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2253 *Campylobacter jejuni* panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2759 *Bordetella pertussis* EC-panB 3-METHYL-2-OXOBUTANOATE
 HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_11 2239 *Bacillus subtilis* panB 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE
 (EC 2_1_2_11)
 2_1_2_9 7323 *Yersinia pseudotuberculosis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1464 *Yersinia pestis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 3929 *Vibrio cholerae* El Tor N16961 ORF00080 METHIONYL-TRNA FORMYLTRANSFERASE (EC
 2_1_2_9)
 2_1_2_9 602 *Ureaplasma urealyticum* UU463 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 487 *Treponema pallidum* TP0756 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 527 *Streptococcus pyogenes* fmt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 663 *Streptococcus pneumoniae* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 938 *Streptococcus mutans* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 845 *Streptococcus equi* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1181 *Staphylococcus aureus* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 3602 *Salmonella typhimurium* fmt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2597 *Salmonella typhi* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 5949 *Salmonella paratyphi* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 3510 *Salmonella enteritidis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1687 *Salmonella dublin* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 6797 *Saccharomyces cerevisiae* FMT1 MITOCHONDRIAL METHIONYL-TRNA
 FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 206 *Rickettsia prowazekii* RP209 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1813 *Pseudomonas aeruginosa* fmt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1622 *Porphyromonas gingivalis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1018 *Pasteurella multocida* fmt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1311 *Neisseria gonorrhoeae* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 300 *Mycoplasma pneumoniae* MP299 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2914 *Mycoplasma genitalium* MG365 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 414 *Mycobacterium tuberculosis* fmt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1302 *Mycobacterium tuberculosis* Rv3404c METHIONYL-TRNA FORMYLTRANSFERASE (EC
 2_1_2_9)
 2_1_2_9 3496 *Mycobacterium leprae* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2127 *Mycobacterium bovis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 3799 *Mycobacterium bovis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 5241 *Klebsiella pneumoniae* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 542 *Helicobacter pylori* HP1141 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1060 *Helicobacter pylori* J99sp|Q9ZK72 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)

2_1_2_9 1357 Haemophilus influenzae HI0623 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1223 Haemophilus ducreyi METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 3206 Escherichia coli fnt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1293 Enterococcus faecium (DOE) METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 842 Enterococcus faecalis METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 989 Corynebacterium diphtheriae METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 126 Clostridium difficile METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2938 Clostridium acetobutylicum 4884450_F1_2 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 504 Chlamydia trachomatis D/UW-3/Cx fnt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 98 Chlamydia pneumoniae AR39 CP0098 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 597 Chlamydia pneumoniae CWL029 fnt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1244 Campylobacter jejuni fnt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 668 Borrelia burgdorferi BB0064 METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1608 Bordetella pertussis METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2808 Bordetella pertussis METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 2809 Bordetella pertussis METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 7250 Bordetella bronchiseptica METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 9326 Bordetella bronchiseptica METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_2_9 1573 Bacillus subtilis fnt METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_3_1 72 Streptococcus equi BIOTIN CARBOXYL CARRIER PROTEIN OF METHYLMALONYL-COA CARBOXYL-TRANSFERASE (EC 2_1_3_1)
 2_1_3_1 1817 Porphyromonas gingivalis BIOTIN CARBOXYL CARRIER PROTEIN OF METHYLMALONYL-COA CARBOXYL-TRANSFERASE (EC 2_1_3_1)
 2_1_3_1 2194 Corynebacterium diphtheriae BIOTIN CARBOXYL CARRIER PROTEIN OF METHYLMALONYL-COA CARBOXYL-TRANSFERASE (EC 2_1_3_1)
 2_1_3_1 2196 Corynebacterium diphtheriae methylmalonyl-CoA carboxyltransferase 12S subunit (EC 2_1_3_1)
 2_1_3_1 2197 Corynebacterium diphtheriae methylmalonyl-CoA carboxyltransferase 5S subunit (EC 2_1_3_1)
 2_1_3_5 6612 Salmonella typhimurium glxB6 oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 688 Salmonella typhi oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 5623 Salmonella paratyphi oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 5624 Salmonella paratyphi oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 2475 Salmonella enteritidis oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 4525 Salmonella dublin oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 4502 Escherichia coli b0515 oxamate carbamoyltransferase (EC 2_1_3_5)
 2_1_3_5 314 Enterococcus faecalis oxamate carbamoyltransferase (EC 2_1_3_5)
 2_3_1_109 6580 Yersinia pseudotuberculosis ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_109 453 Yersinia pestis ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_109 6366 Vibrio cholerae El Tor N16961 ORF03310 ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 6168 Salmonella typhimurium astA ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 1811 Salmonella typhi ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_109 738 Salmonella paratyphi ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_109 1398 Salmonella paratyphi ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 1895 Salmonella enteritidis ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 4572 Salmonella dublin ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 4655 Pseudomonas aeruginosa aruG ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_109 7152 Pseudomonas aeruginosa aruF ARGININE N-SUCCINYLTRANSFERASE, ALPHA CHAIN (EC 2_3_1_109)
 2_3_1_109 1939 Klebsiella pneumoniae ARGININE N-SUCCINYLTRANSFERASE (EC 2_3_1_109)
 2_3_1_109 5080 Escherichia coli b1747 ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_117 6549 Yersinia pseudotuberculosis EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1036 Yersinia pestis EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)

2_3_1_117 6097 *Vibrio cholerae* El Tor N16961 ORF02952 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1292 *Streptococcus pneumoniae* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1526 *Streptococcus mutans* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 3162 *Staphylococcus aureus* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1366 *Salmonella typhimurium* dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 3764 *Salmonella typhi* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 3919 *Salmonella paratyphi* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 3735 *Salmonella enteritidis* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 4235 *Salmonella dublin* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 191 *Rickettsia prowazekii* RP194 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 5052 *Pseudomonas aeruginosa* dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1593 *Pasteurella multocida* dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1562 *Neisseria gonorrhoeae* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 5089 *Mycobacterium tuberculosis* Rv1201c 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1112 *Mycobacterium leprae* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 2120 *Mycobacterium bovis* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 2495 *Klebsiella pneumoniae* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 2496 *Klebsiella pneumoniae* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 60 *Helicobacter pylori* HP0626 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 571 *Helicobacter pylori* J99tr/Q9ZLK9 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 11175 *Haemophilus influenzae* HI1634 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1480 *Haemophilus ducreyi* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 4362 *Escherichia coli* dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1723 *Enterococcus faecium* (DOE) EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 2182 *Enterococcus faecalis* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1419 *Corynebacterium diphtheriae* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1421 *Corynebacterium diphtheriae* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1036 *Clostridium difficile* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 3319 *Clostridium acetobutylicum* 3402160_C2_8 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 907 *Campylobacter jejuni* dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 824 *Bordetella pertussis* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)

2_3_1_117 9229 *Bordetella bronchiseptica* EC-dapD 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_117 1419 *Bacillus subtilis* ykuQ 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_129 4319 *Yersinia pseudotuberculosis* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 1245 *Yersinia pestis* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 6022 *Vibrio cholerae* El Tor N16961 ORF02846 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 5558 *Salmonella typhimurium* lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 598 *Salmonella typhi* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 990 *Salmonella paratyphi* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 5135 *Salmonella enteritidis* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 7 *Rickettsia prowazekii* RP007 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 1262 *Pseudomonas aeruginosa* lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 347 *Porphyromonas gingivalis* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 60 *Pasteurella multocida* lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 1776 *Neisseria gonorrhoeae* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 3217 *Klebsiella pneumoniae* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 3218 *Klebsiella pneumoniae* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 3219 *Klebsiella pneumoniae* ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 767 *Helicobacter pylori* HP1375 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 1278 *Helicobacter pylori* J99trQ9ZJL7 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 12390 *Haemophilus influenzae* HI1061 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 672 *Haemophilus ducreyi* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 181 *Escherichia coli* lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 505 *Chlamydia trachomatis* D/UW-3/Cx EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 97 *Chlamydia pneumoniae* AR39 CP0097 ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 598 *Chlamydia pneumoniae* CWL029 EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 2220 *Campylobacter jejuni* lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 4173 *Bordetella pertussis* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_129 7277 *Bordetella bronchiseptica* EC-lpxA ACYL-[ACYL-CARRIER-PROTEIN]--UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_15 7483 *Yersinia pseudotuberculosis* EC-plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 2334 *Yersinia pestis* EC-plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 3977 *Vibrio cholerae* El Tor N16961 ORF00140 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)

2_3_1_15 2661 *Salmonella typhimurium* plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 1852 *Salmonella typhi* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 5353 *Salmonella paratyphi* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 5355 *Salmonella paratyphi* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 2805 *Salmonella enteritidis* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 2256 *Salmonella dublin* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 6436 *Pseudomonas aeruginosa* plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 1875 *Pasteurella multocida* plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 1166 *Mycobacterium tuberculosis* plsB1 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 5864 *Mycobacterium tuberculosis* plsB2 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 3562 *Mycobacterium lepraetr*Q9X7B0 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 443 *Mycobacterium bovis* EC-plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 1452 *Mycobacterium bovis* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 1642 *Mycobacterium bovis* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 9456 *Klebsiella pneumoniae* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 16658 *Haemophilus influenzae* HI0748 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 178 *Haemophilus ducreyi* EC-plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 6292 *Escherichia coli* plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_15 773 *Chlamydia trachomatis* D/UW-3/Cx plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE PRECURSOR (EC 2_3_1_15)
 2_3_1_15 902 *Chlamydia pneumoniae* AR39 CP0902 GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE PRECURSOR (EC 2_3_1_15)
 2_3_1_15 885 *Chlamydia pneumoniae* CWL029 plsB GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE PRECURSOR (EC 2_3_1_15)
 2_3_1_18 3394 *Staphylococcus aureus* BS-yyal GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 4627 *Salmonella typhi* GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 2130 *Saccharomyces cerevisiae* YJL218W GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 690 *Pseudomonas aeruginosa* PA3853 GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 650 *Pasteurella multocida* BS-yyal GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 4578 *Mycobacterium tuberculosis* Rv3034c GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 3130 *Mycobacterium leprae* EC-yefH GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 196 *Mycobacterium bovis* EC-yefH GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 4433 *Escherichia coli* lacA GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 5228 *Escherichia coli* yefH GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 5249 *Escherichia coli* b2054 GALACTOSIDE ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 3744 *Enterococcus faecium* (DOE) GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 350 *Enterococcus faecalis* GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 2359 *Enterococcus faecalis* GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 1576 *Corynebacterium diphtheriae* GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_18 1049 *Clostridium acetobutylicum* 6147337_C3_51 GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_19 107 *Rickettsia prowazekii* RP109 PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_19 17 *Enterococcus faecalis* BS-yqiS PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_19 3567 *Clostridium difficile* PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_19 1218 *Clostridium acetobutylicum* 36131677_C2_51 PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_19 2404 *Bacillus subtilis* yqiS PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_28 6768 *Vibrio cholerae* El Tor N16961ORFA01206 CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 6811 *Vibrio cholerae* El Tor N16961ORFA01266 CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 923 *Salmonella typhi* CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 1103 *Pseudomonas aeruginosa* cat CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)

2_3_1_28 1889 *Pasteurella multocida* varB CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 1030 *Enterococcus faecium* (DOE) CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 1726 *Clostridium acetobutylicum* 21673217_F1_3 CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_28 3096 *Clostridium acetobutylicum* 35187500_C3_17 CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_30 6922 *Yersinia pseudotuberculosis* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 272 *Yersinia pestis* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 6397 *Vibrio cholerae* El Tor N16961 ORF03348 SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1081 *Streptococcus pyogenes* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 503 *Streptococcus pneumoniae* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1168 *Streptococcus mutans* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 940 *Streptococcus equi* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1733 *Staphylococcus aureus* BS-yvoF SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 3212 *Staphylococcus aureus* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 341 *Salmonella typhimurium* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 2283 *Salmonella typhi* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 4179 *Salmonella paratyphi* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 864 *Salmonella enteritidis* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 3701 *Salmonella dublin* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 2447 *Pseudomonas aeruginosa* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 117 *Pasteurella multocida* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 384 *Neisseria gonorrhoeae* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1340 *Mycobacterium tuberculosis* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 67 *Mycobacterium leprae* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1573 *Mycobacterium bovis* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 2575 *Klebsiella pneumoniae* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 2576 *Klebsiella pneumoniae* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 608 *Helicobacter pylori* HP1210 SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1124 *Helicobacter pylori* J99 cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 4954 *Haemophilus influenzae* HI0606 SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1507 *Haemophilus ducreyi* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 6097 *Escherichia coli* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 3740 *Enterococcus faecium* (DOE) EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 257 *Enterococcus faecalis* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1721 *Corynebacterium diphtheriae* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1242 *Clostridium difficile* EC-cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1108 *Clostridium acetobutylicum* 3937500_C3_62 SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 4002 *Clostridium acetobutylicum* 15720387_F2_1 SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 1364 *Campylobacter jejuni* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 3277 *Bordetella pertussis* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 5598 *Bordetella bronchiseptica* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_30 93 *Bacillus subtilis* cysE SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_31 1111 *Staphylococcus aureus* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 3342 *Staphylococcus aureus* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 8123 *Saccharomyces cerevisiae* MET2 HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 4460 *Pseudomonas aeruginosa* metX HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 1687 *Pasteurella multocida* met2 HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 132 *Neisseria gonorrhoeae* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 5137 *Mycobacterium tuberculosis* metA HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 2951 *Mycobacterium leprae* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 2681 *Haemophilus influenzae* HI1263 HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 386 *Corynebacterium diphtheriae* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 2189 *Bordetella pertussis* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_31 8298 *Bordetella bronchiseptica* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_35 1663 *Streptococcus mutans* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 2318 *Staphylococcus aureus* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 2352 *Staphylococcus aureus* GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)

2_3_1_35 1665 *Pseudomonas aeruginosa* argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1009 *Neisseria gonorrhoeae* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1431 *Mycobacterium tuberculosis* argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 22 *Mycobacterium leprae* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1854 *Mycobacterium bovis* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1489 *Corynebacterium diphtheriae* GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 476 *Clostridium difficile* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 903 *Clostridium acetobutylicum* 24640635_F3_44 GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 904 *Clostridium acetobutylicum* 20884587_F1_6 GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1020 *Clostridium acetobutylicum* 6689193_F1_5 GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1099 *Bordetella pertussis* BS-argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1100 *Bordetella pertussis* GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_35 1121 *Bacillus subtilis* argJ GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)
 2_3_1_38 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3- HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 2_3_1_38 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_38 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_41 4420 *Yersinia pseudotuberculosis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 4774 *Yersinia pseudotuberculosis* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 6592 *Yersinia pseudotuberculosis* EC-fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 3681 *Yersinia pestis* EC-fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 4252 *Yersinia pestis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 4583 *Yersinia pestis* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 5814 *Vibrio cholerae* El Tor N16961 ORF02551 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 5818 *Vibrio cholerae* El Tor N16961 ORF02555 3-OXOACYL-[ACYL-CARRIER-PROTEIN]
 SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 7687 *Vibrio cholerae* El Tor N16961 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC
 2_3_1_41)
 2_3_1_41 469 *Streptococcus pyogenes* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 1059 *Streptococcus pyogenes* fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 1117 *Streptococcus pneumoniae* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II
 (EC 2_3_1_41)
 2_3_1_41 1122 *Streptococcus pneumoniae* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III
 (EC 2_3_1_41)
 2_3_1_41 1503 *Streptococcus mutans* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 1508 *Streptococcus mutans* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 87 *Streptococcus equi* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 240 *Streptococcus equi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1080 *Staphylococcus aureus* BS-yjaX 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III
 (EC 2_3_1_41)
 2_3_1_41 2388 *Staphylococcus aureus* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 1029 *Salmonella typhimurium* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 3036 *Salmonella typhimurium* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC
 2_3_1_41)
 2_3_1_41 4380 *Salmonella typhimurium* fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 1000 *Salmonella typhi* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 2361 *Salmonella typhi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 4932 *Salmonella typhi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 613 *Salmonella paratyphi* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 999 *Salmonella paratyphi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 4122 *Salmonella paratyphi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 4123 *Salmonella paratyphi* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 2117 *Salmonella enteritidis* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 2706 *Salmonella enteritidis* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 3464 *Salmonella enteritidis* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 599 *Salmonella dublin* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 2737 *Saccharomyces cerevisiae* FAS2 FATTY ACID SYNTHASE, SUBUNIT ALPHA (EC 2_3_1_86)
 [INCLUDES: EC 1_1_1_100; EC 2_3_1_41]
 2_3_1_41 5630 *Saccharomyces cerevisiae* CEM1 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II
 (EC 2_3_1_41)
 2_3_1_41 736 *Rickettsia prowazekii* RP764 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 743 *Rickettsia prowazekii* RP772 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 664 *Pseudomonas aeruginosa* fabH2 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC
 2_3_1_41)
 2_3_1_41 3002 *Pseudomonas aeruginosa* fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC
 2_3_1_41)
 2_3_1_41 4137 *Pseudomonas aeruginosa* fabF2 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 5501 *Pseudomonas aeruginosa* fabH1 PUTATIVE 3-OXOACYL-[ACYL-CARRIER-PROTEIN]
 SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 6643 *Pseudomonas aeruginosa* fabF1 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC
 2_3_1_41)
 2_3_1_41 6791 *Pseudomonas aeruginosa* PA3286 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III
 (EC 2_3_1_41)

2_3_1_41 85 *Porphyromonas gingivalis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 1785 *Porphyromonas gingivalis* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 1188 *Pasteurella multocida* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 1375 *Pasteurella multocida* fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)

2_3_1_41 3 *Neurospora crassa* cem-1 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 465 *Neisseria gonorrhoeae* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 506 *Neisseria gonorrhoeae* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 1825 *Neisseria gonorrhoeae* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 2392 *Neisseria gonorrhoeae* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 3923 *Mycobacterium tuberculosis* kasB 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 5297 *Mycobacterium tuberculosis* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 5817 *Mycobacterium tuberculosis* kasA PUTATIVE 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)

2_3_1_41 221 *Mycobacterium leprae* O69474 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 1795 *Mycobacterium leprae* PUTATIVE 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE 2 (EC 2_3_1_41)

2_3_1_41 1879 *Mycobacterium leprae* PUTATIVE 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE 2 (EC 2_3_1_41)

2_3_1_41 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 1654 *Mycobacterium bovis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]

2_3_1_41 3659 *Mycobacterium bovis* EC-fabF PUTATIVE 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)

2_3_1_41 3660 *Mycobacterium bovis* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 5888 *Klebsiella pneumoniae* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 5889 *Klebsiella pneumoniae* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 5895 *Klebsiella pneumoniae* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 5896 *Klebsiella pneumoniae* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)

2_3_1_41 7848 *Klebsiella pneumoniae* 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)

2_3_1_41 8136 *Klebsiella pneumoniae* 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 1152 *Helicobacter pylori* HP0202 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1471 *Helicobacter pylori* HP0558 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 192 *Helicobacter pylori* J99sp|Q9ZMN0 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 508 *Helicobacter pylori* J99tr|Q9ZLS2 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 15027 *Haemophilus influenzae* HI1533 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 17925 *Haemophilus influenzae* HI0157 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 229 *Haemophilus ducreyi* EC-fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 1053 *Escherichia coli* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1057 *Escherichia coli* fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 5416 *Escherichia coli* fabB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_41 2740 *Enterococcus faecium* (DOE) EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 2748 *Enterococcus faecium* (DOE) 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 143 *Enterococcus faecalis* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 148 *Enterococcus faecalis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_41 3023 *Clostridium difficile* BS-yjxX 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 3028 *Clostridium difficile* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 59 *Clostridium acetobutylicum* 34642202_C2_176 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 64 *Clostridium acetobutylicum* 79802_C1_148 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1174 *Clostridium acetobutylicum* 33252318_F3_23 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 1602 *Clostridium acetobutylicum* 23641963_C3_50 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 1605 *Clostridium acetobutylicum* 5126892_C2_43 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1644 *Clostridium acetobutylicum* 23626967_C1_18 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 228 *Chlamydia trachomatis* D/UW-3/Cx EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 739 *Chlamydia trachomatis* D/UW-3/Cx fabF 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I PRECURSOR (EC 2_3_1_41)
 2_3_1_41 460 *Chlamydia pneumoniae* AR39 CP0460 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 950 *Chlamydia pneumoniae* AR39 CP0950 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I PRECURSOR (EC 2_3_1_41)
 2_3_1_41 265 *Chlamydia pneumoniae* CWL029 EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 847 *Chlamydia pneumoniae* CWL029 fabF 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I PRECURSOR (EC 2_3_1_41)
 2_3_1_41 225 *Campylobacter jejuni* fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 2297 *Campylobacter jejuni* fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 749 *Bordetella pertussis* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)

2_3_1_41 753 *Bordetella pertussis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 6994 *Bordetella bronchiseptica* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 8189 *Bordetella bronchiseptica* EC-fabF 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 1017 *Bacillus subtilis* yhfB 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1134 *Bacillus subtilis* yjaX 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_41 1135 *Bacillus subtilis* yjaY 3-OXOACYL-(ACYL-CARRIER-PROTEIN) SYNTHASE II (EC 2_3_1_41)
 2_3_1_41 1712 *Bacillus subtilis* pksF 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE I (EC 2_3_1_41)
 2_3_1_46 6404 *Yersinia pseudotuberculosis* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 904 *Yersinia pestis* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 5417 *Vibrio cholerae* El Tor N16961 ORF02054 HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 371 *Streptococcus pneumoniae* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 742 *Streptococcus mutans* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 1867 *Salmonella typhimurium* metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 1780 *Salmonella typhi* HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 6226 *Salmonella paratyphi* HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 1741 *Salmonella enteritidis* HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 1171 *Klebsiella pneumoniae* HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 3899 *Escherichia coli* metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 2427 *Clostridium difficile* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 2165 *Clostridium acetobutylicum* 7152132_C2_22 HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 1078 *Campylobacter jejuni* metA PROBABLE HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_46 2189 *Bacillus subtilis* metB HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_47 7844 *Yersinia pseudotuberculosis* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 3740 *Yersinia pestis* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 4939 *Vibrio cholerae* El Tor N16961 ORF01456 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1382 *Staphylococcus aureus* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1585 *Salmonella typhimurium* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1586 *Salmonella typhimurium* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 7057 *Salmonella typhimurium* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 4137 *Salmonella typhi* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1701 *Salmonella enteritidis* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1037 *Salmonella dublin* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 3611 *Pseudomonas aeruginosa* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1750 *Porphyromonas gingivalis* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1769 *Porphyromonas gingivalis* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1175 *Pasteurella multocida* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1219 *Neisseria gonorrhoeae* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 93 *Mycobacterium tuberculosis* bioF2 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 5070 *Mycobacterium tuberculosis* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2018 *Mycobacterium leprae* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2019 *Mycobacterium leprae* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2353 *Mycobacterium bovis* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1928 *Klebsiella pneumoniae* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1929 *Klebsiella pneumoniae* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 1931 *Klebsiella pneumoniae* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 34 *Helicobacter pylori* HP0598 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 547 *Helicobacter pylori* J99sp|Q9ZLN3 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 11317 *Haemophilus influenzae* HI1553 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 551 *Haemophilus ducreyi* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)

2_3_1_47 743 *Escherichia coli* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2006 *Corynebacterium diphtheriae* 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 746 *Chlamydia trachomatis* D/UW-3/Cx bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 809 *Chlamydia pneumoniae* AR39 CP0809 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 943 *Chlamydia pneumoniae* AR39 CP0943 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 854 *Chlamydia pneumoniae* CWL029 bioF_1 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 965 *Chlamydia pneumoniae* CWL029 bioF_2 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2262 *Campylobacter jejuni* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 2211 *Bordetella pertussis* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_47 3016 *Bacillus subtilis* bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_54 6846 *Yersinia pseudotuberculosis* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 2742 *Yersinia pestis* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 5662 *Vibrio cholerae* El Tor N16961 ORF02356 FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 700 *Streptococcus pyogenes* pfl FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 716 *Streptococcus pyogenes* pflD FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 223 *Streptococcus pneumoniae* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 1016 *Streptococcus pneumoniae* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 898 *Streptococcus mutans* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 568 *Streptococcus equi* EC-pflB FORMATE ACETYLTRANSFERASE (EC 2_3_1_54)
 2_3_1_54 1396 *Streptococcus equi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 2322 *Staphylococcus aureus* FORMATE ACETYLTRANSFERASE (EC 2_3_1_54)
 2_3_1_54 3501 *Staphylococcus aureus* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 1475 *Salmonella typhimurium* pflD FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 5527 *Salmonella typhimurium* pfl FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 6467 *Salmonella typhimurium* pflF FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 2696 *Salmonella typhi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 4398 *Salmonella typhi* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 65 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 66 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 67 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 68 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 881 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 1031 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 1635 *Salmonella paratyphi* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 2283 *Salmonella enteritidis* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 3765 *Salmonella enteritidis* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 4279 *Salmonella enteritidis* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 927 *Salmonella dublin* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 1469 *Salmonella dublin* PUTATIVE FORMATE ACETYLTRANSFERASE 3 (EC 2_3_1_54)
 2_3_1_54 2252 *Salmonella dublin* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 945 *Pasteurella multocida* pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 967 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 969 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 2743 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 3477 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 3478 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 8170 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 8171 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 8172 *Klebsiella pneumoniae* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 17889 *Haemophilus influenzae* HI0180 FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 377 *Haemophilus ducreyi* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 4649 *Escherichia coli* b0823 FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 4686 *Escherichia coli* pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 1341 *Enterococcus faecium* (DOE) FORMATE ACETYLTRANSFERASE (EC 2_3_1_54)
 2_3_1_54 1942 *Enterococcus faecalis* EC-pflB FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_54 2084 *Corynebacterium diphtheriae* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)

2_3_1_54 1860 *Clostridium difficile* FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 1861 *Clostridium difficile* EC-pfIB FORMATE ACETYLTRANSFERASE (EC 2_3_1_54)
 2_3_1_54 1670 *Clostridium acetobutylicum* 30110285_C2_45 FORMATE ACETYLTRANSFERASE 2 (EC 2_3_1_54)
 2_3_1_54 1671 *Clostridium acetobutylicum* 24800012_C1_39 FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_74 699 *Mycobacterium tuberculosis* pks18 CHALCONE SYNTHASE 2 (EC 2_3_1_74)
 2_3_1_74 1438 *Mycobacterium tuberculosis* pks10 CHALCONE SYNTHASE (EC 2_3_1_74)
 2_3_1_74 3530 *Mycobacterium tuberculosis* pks11 CHALCONE SYNTHASE (EC 2_3_1_74)
 2_3_1_74 94 *Mycobacterium bovis* CHALCONE SYNTHASE 2 (EC 2_3_1_74)
 2_3_1_74 2158 *Mycobacterium bovis* CHALCONE SYNTHASE (EC 2_3_1_74)
 2_3_1_74 3839 *Mycobacterium bovis* BS-bcsA CHALCONE SYNTHASE (EC 2_3_1_74)
 2_3_1_74 2202 *Bacillus subtilis* bcsA CHALCONE SYNTHASE (EC 2_3_1_74)
 2_3_1_79 7342 *Vibrio cholerae* El Tor N16961ORFA00562 PROBABLE MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 781 *Streptococcus pneumoniae* BS-yyal MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 3918 *Salmonella typhimurium* maa MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 4806 *Salmonella typhi* MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 109 *Salmonella paratyphi* MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 7109 *Klebsiella pneumoniae* MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 7110 *Klebsiella pneumoniae* MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 4481 *Escherichia coli* b0459 MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 542 *Enterococcus faecium* (DOE) BS-yyal MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 1290 *Clostridium difficile* BS-yyal PROBABLE MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_79 4079 *Bacillus subtilis* yyal MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_8 7412 *Yersinia pseudotuberculosis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 2617 *Yersinia pestis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4923 *Vibrio cholerae* El Tor N16961 ORF01437 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 413 *Treponema pallidum* TP0094 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 316 *Streptococcus pyogenes* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 776 *Streptococcus pneumoniae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1733 *Streptococcus mutans* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 460 *Streptococcus equi* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 2090 *Staphylococcus aureus* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 5413 *Salmonella typhimurium* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 546 *Salmonella typhi* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 3064 *Salmonella paratyphi* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 6866 *Salmonella paratyphi* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 3192 *Salmonella enteritidis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1773 *Salmonella dublin* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4641 *Pseudomonas aeruginosa* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1515 *Porphyromonas gingivalis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 834 *Pasteurella multocida* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 930 *Neisseria gonorrhoeae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 414 *Mycoplasma pneumoniae* MP412 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4524 *Mycoplasma genitalium* MG299 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1814 *Mycobacterium tuberculosis* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1889 *Mycobacterium leprae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 1890 *Mycobacterium leprae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 3697 *Mycobacterium bovis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4499 *Klebsiella pneumoniae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4500 *Klebsiella pneumoniae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 4502 *Klebsiella pneumoniae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 838 *Helicobacter pylori* J99sp|Q9ZKU4 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 12094 *Haemophilus influenzae* H11203 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 971 *Haemophilus ducreyi* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 2246 *Escherichia coli* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 953 *Enterococcus faecium* (DOE) PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 828 *Corynebacterium diphtheriae* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 3354 *Clostridium acetobutylicum* 4886092_F3_6 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 85 *Campylobacter jejuni* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)

2_3_1_8 847 *Borrelia burgdorferi* BB0589 PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_8 3760 *Bacillus subtilis* pta PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_81 2161 *Bacillus subtilis* yokD AMINOGLYCOSIDE N3'-ACETYLTRANSFERASE III (EC 2_3_1_81)
 2_3_1_82 407 *Klebsiella pneumoniae* sp19650 AMINOGLYCOSIDE N6'-ACETYLTRANSFERASE (EC 2_3_1_82)
 2_3_1_82 416 *Enterococcus faecium* (DOE) AMINOGLYCOSIDE N6'-ACETYLTRANSFERASE (EC 2_3_1_82)
 2_3_1_82 2785 *Clostridium acetobutylicum* 23602217_F2_6 AMINOGLYCOSIDE N6'-ACETYLTRANSFERASE (EC 2_3_1_82)
 2_3_1_84 7847 *Saccharomyces cerevisiae* ATF2 ALCOHOL O-ACETYLTRANSFERASE 2 (EC 2_3_1_84)
 2_3_1_84 8272 *Saccharomyces cerevisiae* ATF1 ALCOHOL O-ACETYLTRANSFERASE 1 (EC 2_3_1_84)
 2_3_1_85 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 1743 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85)
 2_3_1_85 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 2853 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85)
 2_3_1_85 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_85 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_86 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3-HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 2_3_1_86 2737 *Saccharomyces cerevisiae* FAS2 FATTY ACID SYNTHASE, SUBUNIT ALPHA (EC 2_3_1_86) [INCLUDES: EC 1_1_1_100; EC 2_3_1_41]
 2_3_1_86 92 *Pseudomonas aeruginosa* PA5174 FATTY ACID SYNTHASE, SUBUNIT ALPHA (EC 2_3_1_86)
 2_3_1_88 3462 *Saccharomyces cerevisiae* NAT2 N-TERMINAL ACETYLTRANSFERASE 2 (EC 2_3_1_88)
 2_3_1_88 5609 *Saccharomyces cerevisiae* NAT1 N-TERMINAL ACETYLTRANSFERASE 1 (EC 2_3_1_88)
 2_3_1_94 3094 *Bordetella pertussis* ERYTHRONOLIDE SYNTHASE, MODULES 1 AND 2 (EC 2_3_1_94)
 2_4_1_10 84 *Streptococcus mutans* BS-sacB LEVANSUCRASE PRECURSOR (EC 2_4_1_10)
 2_4_1_10 1110 *Klebsiella pneumoniae* LEVANSUCRASE PRECURSOR (EC 2_4_1_10)
 2_4_1_10 3451 *Clostridium acetobutylicum* 12364466_F3_5 LEVANSUCRASE PRECURSOR (EC 2_4_1_10)
 2_4_1_10 4474 *Clostridium acetobutylicum* LEVANSUCRASE (EC 2_4_1_10)
 2_4_1_10 3440 *Bacillus subtilis* sacB LEVANSUCRASE PRECURSOR (EC 2_4_1_10)
 2_4_1_109 2513 *Saccharomyces cerevisiae* YDR307W DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 7 (EC 2_4_1_109)
 2_4_1_109 3585 *Saccharomyces cerevisiae* PMT5 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 5 (EC 2_4_1_109)
 2_4_1_109 4147 *Saccharomyces cerevisiae* PMT3 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 3 (EC 2_4_1_109)
 2_4_1_109 4793 *Saccharomyces cerevisiae* PMT1 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 1 (EC 2_4_1_109)
 2_4_1_109 5147 *Saccharomyces cerevisiae* PMT6 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 6 (EC 2_4_1_109)
 2_4_1_109 5813 *Saccharomyces cerevisiae* PMT2 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 2 (EC 2_4_1_109)
 2_4_1_109 6014 *Saccharomyces cerevisiae* PMT4 DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 4 (EC 2_4_1_109)
 2_4_1_109 20198 *Neurospora crassa* DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 2 (EC 2_4_1_109)
 2_4_1_109 20217 *Neurospora crassa* DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 3 (EC 2_4_1_109)

2_4_1_12 2745 *Salmonella typhi* CELLULOSE SYNTHASE (EC 2_4_1_12)
 2_4_1_12 982 *Salmonella paratyphi* CELLULOSE SYNTHASE (EC 2_4_1_12)
 2_4_1_12 983 *Salmonella paratyphi* CELLULOSE SYNTHASE (EC 2_4_1_12)
 2_4_1_12 5833 *Klebsiella pneumoniae* CELLULOSE SYNTHASE CATALYTIC SUBUNIT (UDP-FORMING)
 (EC 2_4_1_12)
 2_4_1_12 7075 *Klebsiella pneumoniae* CELLULOSE SYNTHASE CATALYTIC SUBUNIT (UDP-FORMING)
 (EC 2_4_1_12)
 2_4_1_12 6065 *Escherichia coli* b3533 CELLULOSE SYNTHASE CATALYTIC SUBUNIT (UDP-FORMING)
 (EC 2_4_1_12)
 2_4_1_12 2832 *Clostridium difficile* CELLULOSE SYNTHASE CATALYTIC SUBUNIT (UDP-FORMING) (EC
 2_4_1_12)
 2_4_1_12 2853 *Clostridium difficile* CELLULOSE SYNTHASE CATALYTIC SUBUNIT (UDP-FORMING) (EC
 2_4_1_12)
 2_4_1_12 1822 *Clostridium acetobutylicum* 26367138_C2_33 CELLULOSE SYNTHASE CATALYTIC
 SUBUNIT (UDP-FORMING) (EC 2_4_1_12)
 2_4_1_12 2773 *Clostridium acetobutylicum* 978377_C3_22 CELLULOSE SYNTHASE CATALYTIC SUBUNIT
 (UDP-FORMING) (EC 2_4_1_12)
 2_4_1_12 4013 *Clostridium acetobutylicum* 4695965_C1_1 CELLULOSE SYNTHASE CATALYTIC SUBUNIT
 (UDP-FORMING) (EC 2_4_1_12)
 2_4_1_131 178 *Saccharomyces cerevisiae* KRE2 GLYCOLIPID 2-ALPHA-MANNOSYLTRANSFERASE (EC
 2_4_1_131)
 2_4_1_131 445 *Saccharomyces cerevisiae* KTR7 PROBABLE MANNOSYLTRANSFERASE KTR7 (EC
 2_4_1_131)
 2_4_1_131 470 *Saccharomyces cerevisiae* YUR1 PROBABLE MANNOSYLTRANSFERASE YUR1 (EC
 2_4_1_131)
 2_4_1_131 472 *Saccharomyces cerevisiae* KTR1 GLYCOLIPID 2-ALPHA-MANNOSYLTRANSFERASE (EC
 2_4_1_131)
 2_4_1_131 2228 *Saccharomyces cerevisiae* KTR6 GLYCOLIPID 2-ALPHA-MANNOSYLTRANSFERASE (EC
 2_4_1_131)
 2_4_1_131 4201 *Saccharomyces cerevisiae* KTR2 PROBABLE MANNOSYLTRANSFERASE KTR2 (EC
 2_4_1_131)
 2_4_1_131 4363 *Saccharomyces cerevisiae* KTR4 PROBABLE MANNOSYLTRANSFERASE KTR4 (EC
 2_4_1_131)
 2_4_1_131 5994 *Saccharomyces cerevisiae* KTR3 GLYCOLIPID 2-ALPHA-MANNOSYLTRANSFERASE (EC
 2_4_1_131)
 2_4_1_131 8489 *Saccharomyces cerevisiae* KTR5 PROBABLE MANNOSYLTRANSFERASE KTR5 (EC
 2_4_1_131)
 2_4_1_15 4715 *Salmonella typhimurium* otsA ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-
 FORMING) (EC 2_4_1_15)
 2_4_1_15 2353 *Salmonella typhi* ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING)
 (EC 2_4_1_15)
 2_4_1_15 3275 *Salmonella paratyphi* ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-
 FORMING) (EC 2_4_1_15)
 2_4_1_15 3277 *Salmonella paratyphi* ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-
 FORMING) (EC 2_4_1_15)
 2_4_1_15 3888 *Salmonella enteritidis* ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-
 FORMING) (EC 2_4_1_15)
 2_4_1_15 1883 *Salmonella dublin* ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING)
 (EC 2_4_1_15)
 2_4_1_15 524 *Saccharomyces cerevisiae* TSL1 ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_15 2316 *Saccharomyces cerevisiae* TPS3 ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_15 8648 *Saccharomyces cerevisiae* TPS1 ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) 56 KD SUBUNIT (EC 2_4_1_15)
 2_4_1_15 2656 *Mycobacterium tuberculosis* otsA ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) 56 KD SUBUNIT (EC 2_4_1_15)
 2_4_1_15 1073 *Mycobacterium leprae*trQ50167 ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_15 3381 *Mycobacterium bovis* EC-otsA ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE
 (UDP-FORMING) 56 KD SUBUNIT (EC 2_4_1_15)

2_4_1_15 2494 *Klebsiella pneumoniae* ALPHA.ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_15 5166 *Escherichia coli* otsA ALPHA.ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_15 1358 *Corynebacterium diphtheriae* ALPHA.ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_157 1170 *Streptococcus pyogenes* BS-ypjH 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 1524 *Streptococcus pneumoniae* BS-ypjH 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 1550 *Streptococcus mutans* 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 920 *Streptococcus equi* BS-ypjH 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 812 *Staphylococcus aureus* BS-ypfP 1,2-diacylglycerol 3-glucosyltransferase (EC 2_4_1_157) / glucosyldiacylglycerol 6-beta-glucosyltransferase (EC 2_4_1_-)
 2_4_1_157 2741 *Enterococcus faecium* (DOE) 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 2828 *Enterococcus faecalis* 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_157 362 *Clostridium difficile* BS-ypfP 1,2-diacylglycerol 3-glucosyltransferase (EC 2_4_1_157) / glucosyldiacylglycerol 6-beta-glucosyltransferase (EC 2_4_1_-)
 2_4_1_157 2045 *Clostridium acetobutylicum* 24647802_F3_22 1,2-diacylglycerol 3-glucosyltransferase (EC 2_4_1_157) / glucosyldiacylglycerol 6-beta-glucosyltransferase (EC 2_4_1_-)
 2_4_1_157 2190 *Bacillus subtilis* ypfP 1,2-diacylglycerol 3-glucosyltransferase (EC 2_4_1_157) / glucosyldiacylglycerol 6-beta-glucosyltransferase (EC 2_4_1_-)
 2_4_1_16 3550 *Saccharomyces cerevisiae* CHS3 CHITIN SYNTHASE 3 (EC 2_4_1_16)
 2_4_1_16 4736 *Saccharomyces cerevisiae* CHS1 CHITIN SYNTHASE 1 (EC 2_4_1_16)
 2_4_1_16 6459 *Saccharomyces cerevisiae* CHS2 CHITIN SYNTHASE 2 (EC 2_4_1_16)
 2_4_1_16 43 *Neurospora crassa* chs-4 CHITIN SYNTHASE 4 (EC 2_4_1_16)
 2_4_1_16 106 *Neurospora crassa* chs-2 CHITIN SYNTHASE 2 (EC 2_4_1_16)
 2_4_1_16 107 *Neurospora crassa* chs-1 CHITIN SYNTHASE 3 (EC 2_4_1_16)
 2_4_1_16 133 *Neurospora crassa* ncchs3 CHITIN SYNTHASE 1 (EC 2_4_1_16)
 2_4_1_16 134 *Neurospora crassa* ncchs2 CHITIN SYNTHASE 2 (EC 2_4_1_16)
 2_4_1_16 20661 *Neurospora crassa* chs-3 CHITIN SYNTHASE 2 (EC 2_4_1_16)
 2_4_1_182 4488 *Yersinia pseudotuberculosis* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 1246 *Yersinia pestis* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 6021 *Vibrio cholerae* El Tor N16961 ORF02844 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 6755 *Salmonella typhimurium* pgsB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 4760 *Salmonella typhi* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 991 *Salmonella paratyphi* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 3106 *Salmonella enteritidis* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 315 *Rickettsia prowazekii* RP321 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 1264 *Pseudomonas aeruginosa* lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 513 *Porphyromonas gingivalis* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 1717 *Porphyromonas gingivalis* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 59 *Pasteurella multocida* lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 1750 *Neisseria gonorrhoeae* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 3220 *Klebsiella pneumoniae* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 3221 *Klebsiella pneumoniae* LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 287 *Helicobacter pylori* HP0867 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 800 *Helicobacter pylori* J99sp|Q9ZKY2 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 12391 *Haemophilus influenzae* HI1060 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 261 *Haemophilus ducreyi* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 182 *Escherichia coli* lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 390 *Chlamydia trachomatis* D/UW-3/Cx EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 895 *Chlamydia pneumoniae* AR39 CP0895 LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 891 *Chlamydia pneumoniae* CWL029 EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 2241 *Campylobacter jejuni* lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)

2_4_1_182 4172 *Bordetella pertussis* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_182 7276 *Bordetella bronchiseptica* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_19 2204 *Clostridium acetobutylicum* 19539818_C3_34 CYCLOMALTODEXTRIN
 GLUCANOTRANSFERASE (EC 2_4_1_19)
 2_4_1_20 554 *Clostridium acetobutylicum* 3126303_C3_47 CELLOBIOSE-PHOSPHORYLASE (EC 2_4_1_20)
 2_4_1_21 5634 *Yersinia pseudotuberculosis* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 376 *Yersinia pestis* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 5524 *Vibrio cholerae* El Tor N16961 ORF02202 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 1333 *Streptococcus pneumoniae* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 1419 *Streptococcus mutans* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 1220 *Streptococcus equi* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 1235 *Salmonella typhimurium* glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 687 *Salmonella typhi* GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 4419 *Salmonella paratyphi* GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 4336 *Salmonella enteritidis* GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 5494 *Pseudomonas aeruginosa* PA2165 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 994 *Porphyromonas gingivalis* GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 703 *Pasteurella multocida* glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 5872 *Klebsiella pneumoniae* GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 2863 *Haemophilus influenzae* H11360 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 6006 *Escherichia coli* glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 632 *Clostridium difficile* EC-glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 1760 *Clostridium acetobutylicum* 3954508_C2_45 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 2205 *Clostridium acetobutylicum* 36522177_C3_33 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 4012 *Clostridium acetobutylicum* 20522501_F3_1 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 764 *Chlamydia trachomatis* D/UW-3/Cx glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 911 *Chlamydia pneumoniae* AR39 CP0911 GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 876 *Chlamydia pneumoniae* CWL029 glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_21 3089 *Bacillus subtilis* glgA GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_25 6960 *Yersinia pseudotuberculosis* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 7618 *Yersinia pseudotuberculosis* EC-glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-
 ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 374 *Yersinia pestis* EC-glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 3763 *Yersinia pestis* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 6533 *Vibrio cholerae* El Tor N16961 ORFA00915 4-ALPHA-GLUCANOTRANSFERASE (EC
 2_4_1_25)
 2_4_1_25 797 *Streptococcus pyogenes* malM 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1571 *Streptococcus pneumoniae* spP29851 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1396 *Streptococcus mutans* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1423 *Streptococcus mutans* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 830 *Streptococcus equi* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1528 *Salmonella typhimurium* glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-
 ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 3953 *Salmonella typhimurium* malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 6562 *Salmonella typhimurium* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 570 *Salmonella typhi* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 2114 *Salmonella typhi* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 3815 *Salmonella typhi* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1066 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 1067 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 1068 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 2350 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 2351 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 3517 *Salmonella paratyphi* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-
 GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 5340 *Salmonella paratyphi* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)

2_4_1_25 5341 *Salmonella paratyphi* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1532 *Salmonella enteritidis* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 4256 *Salmonella enteritidis* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 4334 *Salmonella enteritidis* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 696 *Pseudomonas aeruginosa* PA2160 GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 3214 *Pseudomonas aeruginosa* PA2163 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 814 *Porphyromonas gingivalis* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 705 *Pasteurella multocida* glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 707 *Pasteurella multocida* malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1174 *Mycobacterium tuberculosis* glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 4750 *Mycobacterium tuberculosis* Rv1781c 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1583 *Mycobacterium leprae* EC-glgX GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 7 *Mycobacterium bovis* EC-glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 8 *Mycobacterium bovis* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 3070 *Mycobacterium bovis* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 2110 *Klebsiella pneumoniae* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 2111 *Klebsiella pneumoniae* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 5876 *Klebsiella pneumoniae* GLYCOGEN DEBRANCHING ENZYME (EC 2_4_1_25) (EC 3_2_1_33)
 2_4_1_25 5877 *Klebsiella pneumoniae* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 2861 *Haemophilus influenzae* H11358 GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 6446 *Haemophilus influenzae* H11356 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 5996 *Escherichia coli* malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 6483 *Escherichia coli* glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 100 *Corynebacterium diphtheriae* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 1135 *Corynebacterium diphtheriae* 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 39 *Chlamydia trachomatis* D/UW-3/Cx glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 83 *Chlamydia trachomatis* D/UW-3/Cx EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 367 *Chlamydia pneumoniae* AR39 CP0367 GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 431 *Chlamydia pneumoniae* AR39 CP0431 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 293 *Chlamydia pneumoniae* CWL029 EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 351 *Chlamydia pneumoniae* CWL029 glgX GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 573 *Borrelia burgdorferi* BB0166 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_25 1423 *Bordetella pertussis* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 1828 *Bordetella pertussis* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_25 5276 *Bordetella bronchiseptica* GLYCOGEN DEBRANCHING ENZYME [INCLUDES: 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25); AMYLO-1,6-GLUCOSIDASE (EC 3_2_1_33)]
 2_4_1_33 1699 *Pseudomonas aeruginosa* PA3541 GLUCOSYL TRANSFERASE (probable ALGINATE SYNTHASE (EC 2_4_1_33))
 2_4_1_34 982 *Saccharomyces cerevisiae* FKS3 PUTATIVE 1,3-BETA-GLUCAN SYNTHASE COMPONENT (EC 2_4_1_34)
 2_4_1_34 3766 *Saccharomyces cerevisiae* FKS1 1,3-BETA-GLUCAN SYNTHASE COMPONENT GLS1 (EC 2_4_1_34)
 2_4_1_34 6069 *Saccharomyces cerevisiae* GSC2 1,3-BETA-GLUCAN SYNTHASE COMPONENT GLS2 (EC 2_4_1_34)

2_4_1_34 29 *Neurospora crassa* gs-1 GLUCAN SYNTHASE (EC 2_4_1_34)
 2_4_1_44 629 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 631 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 633 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 634 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 635 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 1719 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 778 *Salmonella typhimurium* waaI LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 5906 *Salmonella paratyphi* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 2556 *Salmonella enteritidis* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 2684 *Salmonella dublin* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_44 6110 *Escherichia coli* rfaI LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_5 218 *Streptococcus pneumoniae* GLUCOSYLTRANSFERASE-S (EC 2_4_1_5)
 2_4_1_5 90 *Streptococcus mutans* GLUCOSYLTRANSFERASE-S (EC 2_4_1_5)
 2_4_1_5 2102 *Streptococcus mutans* GLUCOSYLTRANSFERASE-SI PRECURSOR (EC 2_4_1_5)
 2_4_1_5 1269 *Escherichia coli* b1309 GLUCOSYLTRANSFERASE-S (EC 2_4_1_5)
 2_4_1_5 2102 *Enterococcus faecium* (DOE) GLUCOSYLTRANSFERASE-S (EC 2_4_1_5)
 2_4_1_52 642 *Streptococcus pneumoniae* PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 3097 *Staphylococcus aureus* PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 3544 *Staphylococcus aureus* PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 3545 *Staphylococcus aureus* PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 405 *Rickettsia prowazekii* RP414 POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 761 *Porphyromonas gingivalis* POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_52 3568 *Bacillus subtilis* tagE PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)
 2_4_1_56 782 *Salmonella typhimurium* waaK LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 3150 *Salmonella typhi* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 5902 *Salmonella paratyphi* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 5185 *Salmonella enteritidis* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 3590 *Salmonella dublin* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 453 *Neisseria gonorrhoeae* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 527 *Klebsiella pneumoniae* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 7365 *Klebsiella pneumoniae* LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_56 6106 *Escherichia coli* rfaK LIPOPOLYSACCHARIDE 1,2-N-ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_58 537 *Streptococcus mutans* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)

2_4_1_58 46 *Salmonella typhimurium* waaJ LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 3147 *Salmonella typhi* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 5905 *Salmonella paratyphi* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 2555 *Salmonella enteritidis* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 2682 *Salmonella dublin* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 465 *Rickettsia prowazekii* RP476 LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 802 *Helicobacter pylori* HP1416 LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 1113 *Helicobacter pylori* HP0159 LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 150 *Helicobacter pylori* J99trQ9ZMS1 LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 1299 *Helicobacter pylori* J99trQ9ZJJ6 LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_58 6109 *Escherichia coli* rfaJ LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC 2_4_1_58)
 2_4_1_8 960 *Neisseria gonorrhoeae* BS-yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 961 *Neisseria gonorrhoeae* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 962 *Neisseria gonorrhoeae* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1306 *Mycobacterium tuberculosis* Rv3401 maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 3388 *Mycobacterium tuberculosis* otsB maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1221 *Mycobacterium lepraespj*Q49736 maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 470 *Mycobacterium bovis* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 3717 *Mycobacterium bovis* BS-yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1276 *Escherichia coli* b1316 maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1170 *Enterococcus faecium* (DOE) maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1268 *Enterococcus faecium* (DOE) maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 2097 *Enterococcus faecium* (DOE) maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 2505 *Enterococcus faecium* (DOE) maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 2035 *Enterococcus faecalis* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 2785 *Enterococcus faecalis* BS-yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 518 *Clostridium difficile* BS-yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1491 *Clostridium difficile* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 2885 *Clostridium difficile* maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 1041 *Clostridium acetobutylicum* 24610627_C1_39 maltose phosphorylase (EC 2_4_1_8)
 2_4_1_8 3452 *Bacillus subtilis* yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_2_17 7517 *Yersinia pseudotuberculosis* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 796 *Yersinia pestis* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 4958 *Vibrio cholerae* El Tor N16961 ORF01477 ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1159 *Streptococcus mutans* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 2685 *Staphylococcus aureus* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 500 *Salmonella typhimurium* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 693 *Salmonella typhi* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1568 *Salmonella paratyphi* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1569 *Salmonella paratyphi* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 979 *Salmonella enteritidis* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 3214 *Salmonella dublin* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1069 *Saccharomyces cerevisiae* HIS1 ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 462 *Pseudomonas aeruginosa* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1887 *Pasteurella multocida* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 660 *Neisseria gonorrhoeae* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 2452 *Mycobacterium tuberculosis* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 942 *Mycobacterium lepraespj*Q49776 ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 4048 *Mycobacterium bovis* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 151 *Klebsiella pneumoniae* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 7763 *Klebsiella pneumoniae* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 8270 *Haemophilus influenzae* H10468 ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1967 *Escherichia coli* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)

2_4_2_17 1608 *Corynebacterium diphtheriae* ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 1143 *Clostridium difficile* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 2130 *Clostridium acetobutylicum* 24398467_C1_32 ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 890 *Campylobacter jejuni* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 760 *Bordetella pertussis* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_17 3487 *Bacillus subtilis* hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_17)
 2_4_2_18 8101 *Yersinia pseudotuberculosis* EC-ybiB ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2266 *Yersinia pestis* EC-ybiB ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 4998 *Vibrio cholerae* El Tor N16961 ORF01524 ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 1505 *Streptococcus pneumoniae* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2016 *Streptococcus mutans* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 3402 *Staphylococcus aureus* trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 6440 *Salmonella typhimurium* ybiB ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2088 *Salmonella typhi* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2089 *Salmonella typhi* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 856 *Salmonella paratyphi* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 3795 *Salmonella enteritidis* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 195 *Saccharomyces cerevisiae* TRP4 ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 3630 *Pseudomonas aeruginosa* trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 1538 *Pasteurella multocida* trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 966 *Neisseria gonorrhoeae* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 222 *Mycobacterium tuberculosis* trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 513 *Mycobacterium lepraes* O69581 ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2676 *Mycobacterium bovis* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 7281 *Klebsiella pneumoniae* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 6521 *Haemophilus influenzae* H11389 ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 767 *Escherichia coli* ybiB ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 4844 *Escherichia coli* trpD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 [INCLUDES: GLUTAMINE AMIDOTRANSFERASE; ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)]
 2_4_2_18 2134 *Corynebacterium diphtheriae* ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2030 *Clostridium acetobutylicum* 5866093_F2_4 ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 3235 *Bordetella pertussis* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 7525 *Bordetella bronchiseptica* EC-trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_18 2263 *Bacillus subtilis* trpD ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_2 1031 *Streptococcus pneumoniae* EC-deoA PYRIMIDINE-NUCLEOSIDE PHOSPHORYLASE (EC 2_4_2_2)
 2_4_2_2 554 *Streptococcus mutans* EC-deoA PYRIMIDINE-NUCLEOSIDE PHOSPHORYLASE (EC 2_4_2_2)
 2_4_2_2 1320 *Streptococcus equi* EC-deoA PYRIMIDINE-NUCLEOSIDE PHOSPHORYLASE (EC 2_4_2_2)
 2_4_2_2 3933 *Bacillus subtilis* pdp PYRIMIDINE-NUCLEOSIDE PHOSPHORYLASE (EC 2_4_2_2)
 2_4_2_21 5062 *Vibrio cholerae* El Tor N16961 ORF01605 NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)

2_4_2_21 327 *Salmonella typhimurium* cobT NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2291 *Salmonella typhi* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2911 *Salmonella enteritidis* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 1160 *Salmonella dublin* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2319 *Pseudomonas aeruginosa* cobU NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 1744 *Porphyromonas gingivalis* EC-cobT NICOTINATE-NUCLEOTIDE--
 DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 213 *Mycobacterium tuberculosis* cobT NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2383 *Mycobacterium bovis* EC-cobT NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 6281 *Klebsiella pneumoniae* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 6282 *Klebsiella pneumoniae* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 6283 *Klebsiella pneumoniae* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 4769 *Escherichia coli* b1121 PUTATIVE NICOTINATE-NUCLEOTIDE--
 DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 5206 *Escherichia coli* cobT NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 348 *Corynebacterium diphtheriae* NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 935 *Clostridium difficile* EC-cobT NICOTINATE-NUCLEOTIDE--DIMETHYLBENZIMIDAZOLE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2142 *Clostridium acetobutylicum* 5259765_C1_28 NICOTINATE-NUCLEOTIDE--
 DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_21 2143 *Clostridium acetobutylicum* 26204702_C3_34 NICOTINATE-NUCLEOTIDE--
 DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_22 6051 *Vibrio cholerae* El Tor N16961 ORF02888 XANTHINE-GUANINE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 5400 *Salmonella typhimurium* gpt XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 3436 *Salmonella typhi* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 1150 *Salmonella dublin* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 337 *Saccharomyces cerevisiae* XPT1 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE
 (EC 2_4_2_22)
 2_4_2_22 45 *Pasteurella multocida* gpt XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 260 *Neisseria gonorrhoeae* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 4318 *Klebsiella pneumoniae* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 162 *Helicobacter pylori* HP0735 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 672 *Helicobacter pylori* J99trjQ9ZLA8 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE
 (EC 2_4_2_22)
 2_4_2_22 13228 *Haemophilus influenzae* HI0674 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE
 (EC 2_4_2_22)
 2_4_2_22 20437 *Haemophilus influenzae* HI0692 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE
 (EC 2_4_2_22)
 2_4_2_22 422 *Haemophilus ducreyi* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)
 2_4_2_22 231 *Escherichia coli* gpt XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 843 *Corynebacterium diphtheriae* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_22)

2_4_2_22 183 *Campylobacter jejuni* Cj1370 XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 4295 *Bordetella pertussis* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_22 8557 *Bordetella bronchiseptica* XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_36 692 *Vibrio cholerae* El Tor N16961 ORF01870 CHOLERA ENTEROTOXIN, A CHAIN PRECURSOR (NAD(+)-DIPHTHAMIDE ADP- RIBOSYLTRANSFERASE) (EC 2_4_2_36)
 2_4_2_36 489 *Corynebacterium diphtheriae* DIPHTHERIA TOXIN PRECURSOR (EC 2_4_2_36)
 2_4_2_9 7828 *Yersinia pseudotuberculosis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1816 *Yersinia pestis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 6000 *Vibrio cholerae* El Tor N16961 ORF02816 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 240 *Ureaplasma urealyticum* UU116 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 168 *Treponema pallidum* TP0447 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 169 *Treponema pallidum* TP0448 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 76 *Streptococcus pyogenes* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 167 *Streptococcus pyogenes* pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 860 *Streptococcus pneumoniae* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1691 *Streptococcus pneumoniae* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 912 *Streptococcus mutans* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1913 *Streptococcus mutans* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1154 *Staphylococcus aureus* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1792 *Staphylococcus aureus* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1525 *Salmonella typhimurium* uraP URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 603 *Salmonella typhi* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 4698 *Salmonella paratyphi* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 3669 *Saccharomyces cerevisiae* FUR1 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 453 *Pseudomonas aeruginosa* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 855 *Pseudomonas aeruginosa* pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 454 *Porphyromonas gingivalis*sp|Q9ZNF8 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1099 *Porphyromonas gingivalis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1256 *Pasteurella multocida* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1898 *Pasteurella multocida* pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1421 *Neisseria gonorrhoeae* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 122 *Mycoplasma pneumoniae* MPI21 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 4181 *Mycoplasma genitalium* MG030 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 688 *Mycobacterium tuberculosis* pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 4726 *Mycobacterium tuberculosis* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 88 *Mycobacterium bovis* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 3990 *Mycobacterium bovis*sp|P94928 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 8556 *Klebsiella pneumoniae* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 17329 *Haemophilus influenzae* HI0459 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 19316 *Haemophilus influenzae* HI1228 URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 677 *Haemophilus ducreyi* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 680 *Haemophilus ducreyi* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 5507 *Escherichia coli* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 3064 *Enterococcus faecium* (DOE) URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1034 *Enterococcus faecalis* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1799 *Enterococcus faecalis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)

2_4_2_9 880 *Corynebacterium diphtheriae* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) /
 PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1978 *Corynebacterium diphtheriae* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 156 *Clostridium difficile* BS-pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) /
 PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 1921 *Clostridium difficile* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1319 *Clostridium acetobutylicum* 24803808_C1_38 URACIL PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_9)
 2_4_2_9 2799 *Clostridium acetobutylicum* 976627_F2_10 URACIL PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_9) / PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 2658 *Campylobacter jejuni* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 747 *Bordetella pertussis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 4229 *Bordetella pertussis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 5956 *Bordetella bronchiseptica* URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_4_2_9 1548 *Bacillus subtilis* pyrR URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9) /
 PYRIMIDINE OPERON REGULATORY PROTEIN PYRR
 2_4_2_9 3684 *Bacillus subtilis* upp URACIL PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_9)
 2_5_1_15 5500 *Yersinia pseudotuberculosis* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 815 *Yersinia pestis* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 4497 *Vibrio cholerae* El Tor N16961 ORF00866 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 943 *Streptococcus pyogenes* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 609 *Streptococcus pneumoniae* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 84 *Streptococcus equi* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 2514 *Staphylococcus aureus* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 3583 *Salmonella typhimurium* dhpS DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 5364 *Salmonella typhi* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 5726 *Salmonella typhi* DIHYDROPTEROATE SYNTHASE TYPE II (EC 2_5_1_15)
 2_5_1_15 496 *Salmonella paratyphi* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 4782 *Salmonella enteritidis* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 3033 *Pseudomonas aeruginosa* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1799 *Porphyromonas gingivalis* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1454 *Pasteurella multocida* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 801 *Neisseria gonorrhoeae* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 2976 *Mycobacterium tuberculosis* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 5083 *Mycobacterium tuberculosis* folP2 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1116 *Mycobacterium leprae* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 3075 *Mycobacterium leprae* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 2684 *Mycobacterium bovis* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 3970 *Mycobacterium bovis* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 2733 *Klebsiella pneumoniae* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 3194 *Klebsiella pneumoniae* DIHYDROPTEROATE SYNTHASE TYPE I (EC 2_5_1_15)
 2_5_1_15 6853 *Klebsiella pneumoniae* DIHYDROPTEROATE SYNTHASE TYPE II (EC 2_5_1_15)
 2_5_1_15 628 *Helicobacter pylori* HP1232 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1143 *Helicobacter pylori* J99trQ9ZJ24 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 6411 *Haemophilus influenzae* HI1336 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 11487 *Haemophilus influenzae* HI1464 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1493 *Haemophilus ducreyi* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 5863 *Escherichia coli* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1281 *Enterococcus faecalis* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 381 *Corynebacterium diphtheriae* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1652 *Corynebacterium diphtheriae* DIHYDROPTEROATE SYNTHASE TYPE I (EC 2_5_1_15)
 2_5_1_15 2398 *Corynebacterium diphtheriae* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 1998 *Clostridium difficile* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 987 *Clostridium acetobutylicum* 4884687_C3_64 DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 584 *Chlamydia trachomatis* D/UW-3/Cx folP 2-amino-4-hydroxy-6-hydroxymethyldihydropterin
 pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_5_1_15 1114 *Chlamydia pneumoniae* AR39 CPl114 2-amino-4-hydroxy-6-hydroxymethyldihydropterin
 pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_5_1_15 696 *Chlamydia pneumoniae* CWL029 folP 2-amino-4-hydroxy-6-hydroxymethyldihydropterin
 pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_5_1_15 1409 *Campylobacter jejuni* folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 2678 *Bordetella pertussis* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)

2_5_1_15 6546 *Bordetella bronchiseptica* EC-folP DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_15 77 *Bacillus subtilis* sul DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_17 6704 *Yersinia pseudotuberculosis* EC-btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 2576 *Yersinia pestis* EC-btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 4867 *Vibrio cholerae* El Tor N16961 ORF01371 COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 306 *Salmonella typhimurium* cobA COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1075 *Salmonella typhimurium* eutT ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 698 *Salmonella typhi* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1258 *Salmonella typhi* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1070 *Salmonella paratyphi* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1071 *Salmonella paratyphi* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 2894 *Salmonella paratyphi* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 3626 *Salmonella enteritidis* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 4017 *Salmonella enteritidis* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 4207 *Salmonella dublin* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 6630 *Pseudomonas aeruginosa* cobO COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1818 *Mycobacterium tuberculosis* cobA COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 3733 *Mycobacterium leprae* EC-btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 1107 *Mycobacterium bovis* EC-btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 6045 *Klebsiella pneumoniae* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 6046 *Klebsiella pneumoniae* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 8098 *Klebsiella pneumoniae* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 4847 *Escherichia coli* btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 5490 *Escherichia coli* b2459 ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 2216 *Corynebacterium diphtheriae* COB(I)ALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_17 2073 *Clostridium difficile* ETHANOLAMINE UTILIZATION COBALAMIN ADENOSYLTRANSFERASE (EC 2_5_1_17)
 2_5_1_19 5267 *Yersinia pseudotuberculosis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2527 *Yersinia pestis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 5530 *Vibrio cholerae* El Tor N16961 ORF02208 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1368 *Streptococcus pyogenes* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 390 *Streptococcus pneumoniae* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 563 *Streptococcus mutans* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 800 *Streptococcus equi* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 3316 *Staphylococcus aureus* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 814 *Salmonella typhimurium* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 3547 *Salmonella typhi* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 3162 *Salmonella paratyphi* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 66 *Salmonella enteritidis* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1912 *Salmonella dublin* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)

2_5_1_19 7406 *Pseudomonas aeruginosa* PA3164 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1640 *Porphyromonas gingivalis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 275 *Pasteurella multocida* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 102 *Neisseria gonorrhoeae* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2160 *Mycobacterium tuberculosis* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2587 *Mycobacterium leprae* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1650 *Mycobacterium bovis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 561 *Klebsiella pneumoniae* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1880 *Klebsiella pneumoniae* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1338 *Helicobacter pylori* HP0401 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 971 *Helicobacter pylori* J99sp|Q9ZKF7 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 10560 *Haemophilus influenzae* HI1589 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 919 *Haemophilus ducreyi* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 874 *Escherichia coli* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2435 *Enterococcus faecium* (DOE) 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2192 *Enterococcus faecalis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2439 *Corynebacterium diphtheriae* 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2419 *Clostridium difficile* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1753 *Clostridium acetobutylicum* 29493752_F2_9 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 348 *Chlamydia trachomatis* D/UW-3/Cx EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 813 *Chlamydia pneumoniae* AR39 CP0813 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 961 *Chlamydia pneumoniae* CWL029 EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 1296 *Campylobacter jejuni* aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2867 *Bordetella pertussis* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 148 *Bordetella bronchiseptica* EC-aroA 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_19 2256 *Bacillus subtilis* aroE 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_29 7442 *Yersinia pseudotuberculosis* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) / GERANYLTRANSTRANSFERASE (EC 2_5_1_10); GERANYLGERANYL PYROPHOSPHATE SYNTHASE (EC 2_5_1_29)
 2_5_1_29 994 *Yersinia pestis* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) / GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE (EC 2_5_1_29)
 2_5_1_29 4736 *Vibrio cholerae* El Tor N16961 ORF01181 FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) / GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE (EC 2_5_1_29)

2_5_1_29 546 *Streptococcus pyogenes* fps FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 47 *Streptococcus pneumoniae* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 1447 *Streptococcus mutans* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 1048 *Streptococcus equi* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 5131 *Salmonella typhimurium* ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10); GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 3298 *Salmonella typhi* FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 3985 *Salmonella enteritidis* FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10); GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 6663 *Pseudomonas aeruginosa* ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 714 *Pasteurella multocida* ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 38 *Neurospora crassa* al-3 DIMETHYLLALLYLTRANSFERASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / FARNESYLTRANSTRANSFERASE (EC 2_5_1_29)
 2_5_1_29 10285 *Haemophilus influenzae* HI1438 FARNESYL PYROPHOSPHATE SYNTHETASE (EC
 2_5_1_1) / GERANYLTRANSTRANSFERASE (EC 2_5_1_10); GERANYLGERANYL PYROPHOSPHATE
 SYNTHASE (EC 2_5_1_29)
 2_5_1_29 6 *Haemophilus ducreyi* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 4463 *Escherichia coli* ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 3050 *Clostridium difficile* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_29 2423 *Bacillus subtilis* yqiD FARNESYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_1) /
 GERANYLTRANSTRANSFERASE (EC 2_5_1_10) / GERANYLGERANYL PYROPHOSPHATE SYNTHASE
 (EC 2_5_1_29)
 2_5_1_3 8137 *Yersinia pseudotuberculosis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC
 2_5_1_3)
 2_5_1_3 1984 *Yersinia pestis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 3946 *Vibrio cholerae* El Tor N16961 ORF00103 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE
 (EC 2_5_1_3)
 2_5_1_3 909 *Streptococcus pneumoniae* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC
 2_5_1_3)
 2_5_1_3 915 *Streptococcus pneumoniae* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1602 *Streptococcus mutans* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 3974 *Salmonella typhimurium* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 2949 *Salmonella typhi* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 176 *Salmonella paratyphi* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 7020 *Salmonella paratyphi* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 6728 *Saccharomyces cerevisiae* THI6 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC
 2_5_1_3) / HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_5_1_3 276 *Pseudomonas aeruginosa* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)

2_5_1_3 7953 *Pseudomonas aeruginosa* PA4400 MUTATOR MUTT PROTEIN (7,8-DIHYDRO-8-OXOGUANINE-TRIPHOSPHATASE) (8-OXO-DGTPASE) (EC 3_6_1_-) / THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1259 *Porphyromonas gingivalis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3) / PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49) / THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 200 *Pasteurella multocida* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 867 *Neisseria gonorrhoeae* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1786 *Mycobacterium tuberculosis* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 2131 *Mycobacterium lepraesp*Q9ZBL5 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 4105 *Mycobacterium bovis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 5412 *Klebsiella pneumoniae* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 265 *Helicobacter pylori* HP0843 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 780 *Helicobacter pylori* J99spQ9ZL01 PROBABLE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 8137 *Haemophilus influenzae* HI0417 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 6276 *Escherichia coli* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1444 *Enterococcus faecalis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1774 *Corynebacterium diphtheriae* THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1249 *Clostridium difficile* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 3592 *Clostridium acetobutylicum* 22845252_C3_9 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 2884 *Campylobacter jejuni* thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 1102 *Bordetella pertussis* MUTATOR MUTT PROTEIN (7,8-DIHYDRO-8-OXOGUANINE-TRIPHOSPHATASE) (8-OXO-DGTPASE) (EC 3_6_1_-) / THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 3747 *Bordetella pertussis* EC-thiE THIAMIN PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_3 3822 *Bacillus subtilis* thiC THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_5_1_30 121 *Enterococcus faecium* (DOE) HEPTAPRENYL DIPHOSPHATE SYNTHASE COMPONENT I (EC 2_5_1_30)
 2_5_1_30 1729 *Enterococcus faecium* (DOE) HEPTAPRENYL DIPHOSPHATE SYNTHASE COMPONENT II (EC 2_5_1_30)
 2_5_1_30 2154 *Enterococcus faecalis* HEPTAPRENYL DIPHOSPHATE SYNTHASE COMPONENT II (EC 2_5_1_30)
 2_5_1_30 2244 *Enterococcus faecalis* HEPTAPRENYL DIPHOSPHATE SYNTHASE COMPONENT II (EC 2_5_1_30)
 2_5_1_30 2270 *Bacillus subtilis* gerCC HEPTAPRENYL DIPHOSPHATE SYNTHASE COMPONENT II (EC 2_5_1_30)
 2_5_1_31 970 *Yersinia pestis* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 6030 *Vibrio cholerae* El Tor NI6961 ORF02856 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 30 *Treponema pallidum* TP0603 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 303 *Streptococcus pyogenes* uppS UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 232 *Streptococcus pneumoniae* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 486 *Streptococcus mutans* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 2059 *Streptococcus mutans* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 3172 *Staphylococcus aureus* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 3564 *Salmonella typhimurium* rth UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 4759 *Salmonella typhi* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 2453 *Salmonella paratyphi* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 3389 *Salmonella enteritidis* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 416 *Rickettsia prowazekii* RP425 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)

2_5_1_31 5275 *Pseudomonas aeruginosa* uppS UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 916 *Porphyromonas gingivalis* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 67 *Pasteurella multocida* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1765 *Neisseria gonorrhoeae* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 5921 *Klebsiella pneumoniae* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 617 *Helicobacter pylori* HP1221 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1132 *Helicobacter pylori* J99 jhp1142 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 12669 *Haemophilus influenzae* HI0920 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 665 *Haemophilus ducreyi* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 174 *Escherichia coli* b0174 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1330 *Enterococcus faecalis* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1601 *Corynebacterium diphtheriae* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 2374 *Corynebacterium diphtheriae* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 776 *Clostridium difficile* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1280 *Clostridium difficile* UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 2640 *Clostridium acetobutylicum* 36540678_C2_20 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 3328 *Clostridium acetobutylicum* 4556412_C3_17 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 430 *Chlamydia trachomatis* D/UW-3/Cx BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 183 *Chlamydia pneumoniae* AR39 CP0183 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 516 *Chlamydia pneumoniae* CWL029 BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 398 *Campylobacter jejuni* uppS UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 613 *Borrelia burgdorferi* BB0120 UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 4122 *Bordetella pertussis* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 5017 *Bordetella bronchiseptica* BS-yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_31 1653 *Bacillus subtilis* yIuA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC 2_5_1_31)
 2_5_1_7 7299 *Yersinia pseudotuberculosis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 238 *Yersinia pestis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 6271 *Vibrio cholerae* El Tor N16961 ORF03179 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 325 *Treponema pallidum* TP0159 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 361 *Treponema pallidum* TP0029 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 490 *Streptococcus pyogenes* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 1362 *Streptococcus pyogenes* murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 760 *Streptococcus pneumoniae* BS-murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)

2_5_1_7 1652 *Streptococcus pneumoniae* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 709 *Streptococcus mutans* BS-murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 2061 *Streptococcus mutans* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 56 *Streptococcus equi* BS-murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 206 *Streptococcus equi* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 3313 *Staphylococcus aureus* BS-murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 3603 *Staphylococcus aureus* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 4539 *Salmonella typhi* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 491 *Salmonella paratyphi* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 1217 *Salmonella paratyphi* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 4075 *Salmonella enteritidis* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 661 *Salmonella dublin* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 561 *Rickettsia prowazekii* RP579 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 460 *Pseudomonas aeruginosa* murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 260 *Porphyromonas gingivalis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 197 *Pasteurella multocida* murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 287 *Neisseria gonorrhoeae* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 131 *Mycobacterium tuberculosis* murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 1177 *Mycobacterium leprae* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 1664 *Mycobacterium leprae* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 3058 *Mycobacterium bovis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 4924 *Klebsiella pneumoniae* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 4925 *Klebsiella pneumoniae* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 4926 *Klebsiella pneumoniae* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 82 *Helicobacter pylori* HP0648 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 593 *Helicobacter pylori* J99sp|Q9ZL16 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 15999 *Haemophilus influenzae* HI1081 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 1426 *Haemophilus ducreyi* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 5871 *Escherichia coli* murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 111 *Enterococcus faecium* (DOE) UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
2_5_1_7 2389 *Enterococcus faecium* (DOE) UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)

2_5_1_7 217 *Enterococcus faecalis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 321 *Corynebacterium diphtheriae* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 1078 *Clostridium difficile* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 30 *Clostridium acetobutylicum* 976552_C3_216 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 1301 *Clostridium acetobutylicum* 29306527_C1_48 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 435 *Chlamydia trachomatis* D/UW-3/Cx EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 178 *Chlamydia pneumoniae* AR39 CP0178 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 521 *Chlamydia pneumoniae* CWL029 EC-murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 342 *Campylobacter jejuni* murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 280 *Borrelia burgdorferi* BB0472 UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 759 *Bordetella pertussis* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 1260 *Bordetella pertussis* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 1261 *Bordetella pertussis* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 4984 *Bordetella bronchiseptica* UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 6065 *Bordetella bronchiseptica* BS-murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 3671 *Bacillus subtilis* murA UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_7 3705 *Bacillus subtilis* murZ UDP-N-ACETYLGLUCOSAMINE 1-CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_8 7219 *Yersinia pseudotuberculosis* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 3691 *Yersinia pestis* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 4221 *Vibrio cholerae* El Tor N16961 ORF00488 TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 589 *Treponema pallidum* TP0637 TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1587 *Streptococcus pyogenes* miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1339 *Streptococcus pneumoniae* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 2169 *Streptococcus mutans* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1027 *Streptococcus equi* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1579 *Staphylococcus aureus* EC-miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 3544 *Salmonella typhimurium* miaA TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 2651 *Salmonella typhi* TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1205 *Salmonella paratyphi* TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1523 *Salmonella enteritidis* TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1766 *Salmonella dublin* TRNA DELTA(2)-ISOPENTENYL PYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)

2_5_1_8 8194 *Saccharomyces cerevisiae* MOD5 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 496 *Rickettsia prowazekii* RP510 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1777 *Pseudomonas aeruginosa* miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 937 *Porphyromonas gingivalis* TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE
(EC 2_5_1_8)
2_5_1_8 1205 *Porphyromonas gingivalis* TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 294 *Pasteurella multocida* trpX TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE
(EC 2_5_1_8)
2_5_1_8 540 *Neisseria gonorrhoeae* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 3901 *Mycobacterium tuberculosis* Rv2728c TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 3902 *Mycobacterium tuberculosis* miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1322 *Mycobacterium lepraesp*|P46811 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1323 *Mycobacterium lepraetrj*|Q49835 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 2935 *Mycobacterium bovis* TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE
(EC 2_5_1_8)
2_5_1_8 2936 *Mycobacterium bovis* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 8273 *Klebsiella pneumoniae* TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE
(EC 2_5_1_8)
2_5_1_8 801 *Helicobacter pylori* HP1415 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1298 *Helicobacter pylori* J99sp|Q9ZJJ7 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 3806 *Haemophilus influenzae* HI0068 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1173 *Haemophilus ducreyi* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 4054 *Escherichia coli* miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE
(EC 2_5_1_8)
2_5_1_8 2544 *Enterococcus faecium* (DOE) TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 2140 *Enterococcus faecalis* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1640 *Corynebacterium diphtheriae* TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1678 *Clostridium difficile* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1244 *Clostridium acetobutylicum* 34181503_C2_43 TRNA DELTA(2)-
ISOPENTENYLPYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
2_5_1_8 2382 *Clostridium acetobutylicum* 4767213_C3_35 TRNA DELTA(2)-
ISOPENTENYLPYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
2_5_1_8 735 *Chlamydia trachomatis* D/UW-3/Cx EC-miaA TRNA DELTA(2)-
ISOPENTENYLPYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
2_5_1_8 956 *Chlamydia pneumoniae* AR39 CP0956 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 842 *Chlamydia pneumoniae* CWL029 EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 2073 *Campylobacter jejuni* miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 294 *Borrelia burgdorferi* BB0821 TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)
2_5_1_8 1580 *Bordetella pertussis* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
TRANSFERASE (EC 2_5_1_8)

2_5_1_8 5065 *Bordetella bronchiseptica* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_8 1733 *Bacillus subtilis* miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE TRANSFERASE (EC 2_5_1_8)
 2_5_1_9 4806 *Yersinia pseudotuberculosis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 1132 *Yersinia pestis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2737 *Yersinia pestis* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 6042 *Vibrio cholerae* El Tor N16961 ORF02875 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 6044 *Vibrio cholerae* El Tor N16961 ORF02877 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 1206 *Streptococcus pneumoniae* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1208 *Streptococcus pneumoniae* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 835 *Staphylococcus aureus* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2887 *Staphylococcus aureus* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 3128 *Staphylococcus aureus* 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2941 *Salmonella typhimurium* ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 5138 *Salmonella typhimurium* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 4790 *Salmonella typhi* 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 5017 *Salmonella typhi* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 305 *Salmonella paratyphi* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 4746 *Salmonella paratyphi* 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 291 *Salmonella enteritidis* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 1460 *Salmonella dublin* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2348 *Salmonella dublin* 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1813 *Saccharomyces cerevisiae* RIB5 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 7708 *Saccharomyces cerevisiae* RIB4 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 489 *Pseudomonas aeruginosa* ribE 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 6657 *Pseudomonas aeruginosa* ribC RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 135 *Porphyromonas gingivalis* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1113 *Porphyromonas gingivalis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 860 *Pasteurella multocida* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1586 *Pasteurella multocida* ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 747 *Neisseria gonorrhoeae* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 1703 *Neisseria gonorrhoeae* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 420 *Mycobacterium tuberculosis* ribC RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 424 *Mycobacterium tuberculosis* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2031 *Mycobacterium leprae* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2033 *Mycobacterium leprae* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 4006 *Mycobacterium bovis* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 4010 *Mycobacterium bovis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 3097 *Klebsiella pneumoniae* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 952 *Helicobacter pylori* HP1574 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 968 *Helicobacter pylori* HP0002 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2 *Helicobacter pylori* J99 ribE 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1471 *Helicobacter pylori* J99 ribC RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2772 *Haemophilus influenzae* H11303 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 10616 *Haemophilus influenzae* H11613 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 691 *Haemophilus ducreyi* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 693 *Haemophilus ducreyi* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 399 *Escherichia coli* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 5029 *Escherichia coli* ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)

2_5_1_9 993 *Corynebacterium diphtheriae* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 995 *Corynebacterium diphtheriae* 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 3266 *Clostridium difficile* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 3268 *Clostridium difficile* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 1403 *Clostridium acetobutylicum* 24647252_C3_54 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 1405 *Clostridium acetobutylicum* 1172250_C1_43 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 385 *Chlamydia trachomatis* D/UW-3/Cx EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 701 *Chlamydia trachomatis* D/UW-3/Cx EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 220 *Chlamydia pneumoniae* AR39 CP0220 RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 996 *Chlamydia pneumoniae* AR39 CP0996 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 484 *Chlamydia pneumoniae* CWL029 EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 805 *Chlamydia pneumoniae* CWL029 EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2383 *Campylobacter jejuni* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2535 *Campylobacter jejuni* ribA RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 2504 *Bordetella pertussis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 3711 *Bordetella pertussis* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 6184 *Bordetella bronchiseptica* RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_5_1_9 8923 *Bordetella bronchiseptica* EC-ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2321 *Bacillus subtilis* ribH 6,7-DIMETHYL-8-RIBITYLLUMAZINE SYNTHASE (EC 2_5_1_9)
 2_5_1_9 2323 *Bacillus subtilis* ribB RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC 2_5_1_9)
 2_6_1_11 5216 *Yersinia pseudotuberculosis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 5788 *Yersinia pseudotuberculosis* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6856 *Yersinia pseudotuberculosis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 452 *Yersinia pestis* Q9ZC66 ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 525 *Yersinia pestis* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 2463 *Yersinia pestis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6367 *Vibrio cholerae* El Tor N16961 ORF03311 ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 62 *Streptococcus mutans* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3612 *Staphylococcus aureus* BS-rocD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3670 *Salmonella typhimurium* oat ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3996 *Salmonella typhimurium* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6167 *Salmonella typhimurium* astC ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 704 *Salmonella typhi* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3409 *Salmonella typhi* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 4749 *Salmonella paratyphi* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 4842 *Salmonella paratyphi* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 2433 *Salmonella enteritidis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3336 *Salmonella dublin* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1668 *Saccharomyces cerevisiae* ARG8 ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3260 *Pseudomonas aeruginosa* aruC ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 7663 *Pseudomonas aeruginosa* PA0530 ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1380 *Pasteurella multocida* argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1546 *Neisseria gonorrhoeae* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 5045 *Mycobacterium tuberculosis* argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 24 *Mycobacterium leprae* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1856 *Mycobacterium bovis* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1935 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1936 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1937 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1938 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)

2_6_1_11 2927 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 5561 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 5562 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6213 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6214 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6215 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6348 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 6349 *Klebsiella pneumoniae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 299 *Haemophilus ducreyi* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 2995 *Escherichia coli* ygiG ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 5966 *Escherichia coli* argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1487 *Corynebacterium diphtheriae* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 474 *Clostridium difficile* EC-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 899 *Clostridium acetobutylicum* 23683213_C2_73 ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 2153 *Campylobacter jejuni* argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1692 *Bordetella pertussis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3641 *Bordetella pertussis* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 3957 *Bordetella pertussis* BS-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 7407 *Bordetella bronchiseptica* ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 8202 *Bordetella bronchiseptica* BS-argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 1123 *Bacillus subtilis* argD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_11 4028 *Bacillus subtilis* rocD ACETYLORNITHINE AMINOTRANSFERASE (EC 2_6_1_11)
 2_6_1_17 825 *Bordetella pertussis* BS-ykrV N-SUCCINYL-L,L-DAP AMINOTRANSFERASE (EC 2_6_1_17)
 2_6_1_17 9230 *Bordetella bronchiseptica* BS-ykrV N-SUCCINYL-L,L-DAP AMINOTRANSFERASE (EC 2_6_1_17)
 2_6_1_18 3304 *Pseudomonas aeruginosa* PA5313 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 4014 *Pseudomonas aeruginosa* PA0299 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 6203 *Pseudomonas aeruginosa* PA0221 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 7365 *Pseudomonas aeruginosa* PA4805 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 8497 *Pseudomonas aeruginosa* PA0132 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 6011 *Mycobacterium tuberculosis* Rv3329 OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 2200 *Mycobacterium bovis* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 2201 *Mycobacterium bovis* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 6848 *Klebsiella pneumoniae* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 673 *Bordetella pertussis* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 1386 *Bordetella pertussis* BS-yodT OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 1513 *Bordetella pertussis* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 2489 *Bordetella pertussis* BS-yhxA OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 3028 *Bordetella pertussis* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 5624 *Bordetella bronchiseptica* BS-yodT OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 6206 *Bordetella bronchiseptica* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 6678 *Bordetella bronchiseptica* BS-yhxA OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)

2_6_1_18 7728 *Bordetella bronchiseptica* OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_18 1971 *Bacillus subtilis* yodT OMEGA-AMINO ACID--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_21 906 *Staphylococcus aureus* trjQ9KWZ6 D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 316 *Clostridium acetobutylicum* 24250437_C2_113 D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 2816 *Clostridium acetobutylicum* 22664000_F1_1 D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 927 *Bordetella pertussis* D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 3565 *Bordetella pertussis* BS-yheM D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 6266 *Bordetella bronchiseptica* D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_21 966 *Bacillus subtilis* yheM D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_36 2852 *Mycobacterium tuberculosis* lat L-LYSINE-EPSILON AMINOTRANSFERASE (EC 2_6_1_36)
 2_6_1_36 1275 *Mycobacterium leprae* L-LYSINE-EPSILON AMINOTRANSFERASE (EC 2_6_1_36)
 2_6_1_36 2136 *Mycobacterium leprae* L-LYSINE-EPSILON AMINOTRANSFERASE (EC 2_6_1_36)
 2_6_1_36 222 *Mycobacterium bovis* L-LYSINE-EPSILON AMINOTRANSFERASE (EC 2_6_1_36)
 2_6_1_37 7110 *Vibrio cholerae* El Tor N16961ORFA00272 (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 5123 *Salmonella typhimurium* trjP96060 (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 1625 *Salmonella typhi* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 5023 *Salmonella paratyphi* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 5024 *Salmonella paratyphi* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 1077 *Salmonella dublin* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 465 *Pseudomonas aeruginosa* phnW (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 8360 *Klebsiella pneumoniae* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 8361 *Klebsiella pneumoniae* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 607 *Enterococcus faecium* (DOE) (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_37 1560 *Clostridium difficile* (2-aminoethyl)phosphonate--pyruvate transaminase (EC 2_6_1_37)
 2_6_1_46 7330 *Vibrio cholerae* El Tor N16961ORFA00548 DIAMINO BUTYRATE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_46 6134 *Pseudomonas aeruginosa* PA2413 DIAMINO BUTYRATE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_46 16249 *Haemophilus influenzae* HI0949 DIAMINO BUTYRATE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_46 1184 *Haemophilus ducreyi* DIAMINO BUTYRATE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_46 8892 *Bordetella bronchiseptica* DIAMINO BUTYRATE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_52 5066 *Yersinia pseudotuberculosis* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 2528 *Yersinia pestis* BS-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 4985 *Vibrio cholerae* El Tor N16961 ORF01506 PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 1494 *Streptococcus mutans* BS-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 813 *Salmonella typhimurium* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 3548 *Salmonella typhi* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 3163 *Salmonella paratyphi* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 1350 *Salmonella enteritidis* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 5250 *Saccharomyces cerevisiae* SER1 PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 5704 *Pseudomonas aeruginosa* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 339 *Porphyromonas gingivalis* EC-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 273 *Pasteurella multocida* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 561 *Neisseria gonorrhoeae* EC-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 734 *Mycobacterium tuberculosis* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 2560 *Mycobacterium leprae* BS-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 2707 *Mycobacterium leprae* sp1O33062 PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 1663 *Mycobacterium bovis* BS-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 1879 *Klebsiella pneumoniae* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 19442 *Haemophilus influenzae* HI1167 PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 918 *Haemophilus ducreyi* BS-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 873 *Escherichia coli* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)

2_6_1_52 1484 *Corynebacterium diphtheriae* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 2769 *Campylobacter jejuni* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 196 *Bordetella pertussis* EC-serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 8765 *Bordetella bronchiseptica* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_52 1002 *Bacillus subtilis* serC PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_57 7907 *Yersinia pseudotuberculosis* EC-tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 1614 *Yersinia pestis* EC-tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 7019 *Vibrio cholerae* El Tor N16961ORFA00156 AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 1837 *Salmonella typhimurium* tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 4308 *Salmonella typhi* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 4199 *Salmonella paratyphi* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 4200 *Salmonella paratyphi* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 1048 *Salmonella enteritidis* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 2351 *Salmonella dublin* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 6038 *Pseudomonas aeruginosa* phhC AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 7121 *Pseudomonas aeruginosa* PA3139 AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 451 *Neisseria gonorrhoeae* EC-tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 8455 *Klebsiella pneumoniae* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 3940 *Escherichia coli* tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 607 *Chlamydia trachomatis* D/UW-3/Cx tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 5 *Chlamydia pneumoniae* AR39 CP0005 AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 681 *Chlamydia pneumoniae* CWL029 tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 2070 *Bordetella pertussis* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 4652 *Bordetella pertussis* AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_57 6116 *Bordetella bronchiseptica* EC-tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE (EC 2_6_1_57)
 2_6_1_62 6402 *Yersinia pseudotuberculosis* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1009 *Yersinia pestis* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 4937 *Vibrio cholerae* El Tor N16961 ORF01453 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2106 *Streptococcus mutans* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1428 *Staphylococcus aureus* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2635 *Staphylococcus aureus* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1581 *Salmonella typhimurium* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 7058 *Salmonella typhimurium* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 3590 *Salmonella typhi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 151 *Salmonella paratyphi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 152 *Salmonella paratyphi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1892 *Salmonella paratyphi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1893 *Salmonella paratyphi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)

2_6_1_62 7017 *Salmonella paratyphi* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 4712 *Salmonella enteritidis* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2737 *Salmonella dublin* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 7638 *Saccharomyces cerevisiae* BIO3 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 7354 *Pseudomonas aeruginosa* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 602 *Porphyromonas gingivalis* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1174 *Pasteurella multocida* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 761 *Neisseria gonorrhoeae* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2622 *Mycobacterium tuberculosis* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 1580 *Mycobacterium lepraespi*P45488 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 12 *Mycobacterium bovis* BS-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 8931 *Klebsiella pneumoniae* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 388 *Helicobacter pylori* HP0976 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 907 *Helicobacter pylori* J99sp|Q9ZKM5 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 14991 *Haemophilus influenzae* HI1554 ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 550 *Haemophilus ducreyi* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 4623 *Escherichia coli* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 821 *Corynebacterium diphtheriae* ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 3486 *Clostridium acetobutylicum* 25557837_C2_9 ADENOSYLMETHIONINE-8-AMINO-7-
 OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 811 *Chlamydia pneumoniae* AR39 CP0811 ADENOSYLMETHIONINE-8-AMINO-7-
 OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 963 *Chlamydia pneumoniae* CWL029 EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-
 OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2263 *Campylobacter jejuni* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 2212 *Bordetella pertussis* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 925 *Bacillus subtilis* yhxA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_62 3017 *Bacillus subtilis* bioA ADENOSYLMETHIONINE-8-AMINO-7-OXONONANOATE
 AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_66 5309 *Yersinia pseudotuberculosis* EC-avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC
 2_6_1_66)
 2_6_1_66 1252 *Yersinia pestis* EC-avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 3903 *Vibrio cholerae* El Tor N16961 ORF00045 VALINE--PYRUVATE AMINOTRANSFERASE (EC
 2_6_1_66)
 2_6_1_66 3160 *Salmonella typhimurium* avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 2826 *Salmonella typhi* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 4522 *Salmonella paratyphi* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 4523 *Salmonella paratyphi* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 2212 *Salmonella enteritidis* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 1392 *Neisseria gonorrhoeae* EC-avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 4696 *Klebsiella pneumoniae* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)

2_6_1_66 4697 *Klebsiella pneumoniae* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 4698 *Klebsiella pneumoniae* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_66 4699 *Klebsiella pneumoniae* VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66).
 2_6_1_66 3492 *Escherichia coli* avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC 2_6_1_66)
 2_6_1_9 7519 *Yersinia pseudotuberculosis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 363 *Yersinia pestis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 4960 *Vibrio cholerae* El Tor N16961 ORF01479 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1161 *Streptococcus mutans* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1896 *Staphylococcus aureus* BS-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1910 *Staphylococcus aureus* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2249 *Salmonella typhimurium* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1209 *Salmonella typhi* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1574 *Salmonella paratyphi* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1575 *Salmonella paratyphi* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1576 *Salmonella paratyphi* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1577 *Salmonella paratyphi* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 52 *Salmonella enteritidis* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 3212 *Salmonella dublin* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 6721 *Saccharomyces cerevisiae* HIS5 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 289 *Pseudomonas aeruginosa* hisC1 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 3028 *Pseudomonas aeruginosa* hisC2 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 8442 *Pseudomonas aeruginosa* PA2531 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 171 *Porphyromonas gingivalis* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 502 *Porphyromonas gingivalis* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 274 *Pasteurella multocida* hisH_1 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1891 *Pasteurella multocida* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 53 *Neisseria gonorrhoeae* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1423 *Mycobacterium tuberculosis* hisC2 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2634 *Mycobacterium tuberculosis* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 717 *Mycobacterium leprae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 718 *Mycobacterium leprae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1688 *Mycobacterium leprae*trjQ9X7B8 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2854 *Mycobacterium leprae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 151 *Mycobacterium bovis* BS-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2255 *Mycobacterium bovis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2256 *Mycobacterium bovis* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 3964 *Klebsiella pneumoniae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 7759 *Klebsiella pneumoniae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1005 *Haemophilus influenzae* HI0470 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 19443 *Haemophilus influenzae* HII166 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1969 *Escherichia coli* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 34 *Corynebacterium diphtheriae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 940 *Corynebacterium diphtheriae* HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1144 *Clostridium difficile* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1618 *Clostridium difficile* BS-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 1010 *Clostridium acetobutylicum* 23438750_F1_1 HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 712 *Campylobacter jejuni* Cj1436c HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)

2_6_1_9 714 *Campylobacter jejuni* Cj1437c HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2278 *Campylobacter jejuni* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 762 *Bordetella pertussis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 4302 *Bordetella pertussis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 7808 *Bordetella bronchiseptica* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 8129 *Bordetella bronchiseptica* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_6_1_9 2258 *Bacillus subtilis* hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE (EC 2_6_1_9)
 2_7_1_108 6646 *Saccharomyces cerevisiae* SEC59 DOLICHOL KINASE (EC 2_7_1_108)
 2_7_1_116 7358 *Yersinia pseudotuberculosis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 3774 *Yersinia pestis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 3000 *Salmonella typhimurium* aceK ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 3684 *Salmonella typhi* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 1127 *Salmonella paratyphi* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 3995 *Salmonella enteritidis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 1995 *Salmonella dublin* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 5168 *Pseudomonas aeruginosa* aceK ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 1551 *Klebsiella pneumoniae* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 1552 *Klebsiella pneumoniae* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 3902 *Escherichia coli* aceK ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 2514 *Bordetella pertussis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 2515 *Bordetella pertussis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_116 8094 *Bordetella bronchiseptica* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
 2_7_1_12 6601 *Yersinia pseudotuberculosis* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 1566 *Yersinia pestis* GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 5225 *Yersinia pestis* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 1980 *Staphylococcus aureus* BS-gntK GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 3683 *Staphylococcus aureus* GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4248 *Salmonella typhimurium* gntK THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 6203 *Salmonella typhimurium* idnK THERMOSENSITIVE GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 1280 *Salmonella typhi* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 2042 *Salmonella paratyphi* THERMOSENSITIVE GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4319 *Salmonella enteritidis* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4367 *Salmonella enteritidis* THERMOSENSITIVE GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 2229 *Salmonella dublin* THERMOSENSITIVE GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 3972 *Salmonella dublin* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 6201 *Saccharomyces cerevisiae* YDR248C THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 819 *Pseudomonas aeruginosa* PA2321 GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 1653 *Pasteurella multocida* glk THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 1478 *Neisseria gonorrhoeae* EC-gntV THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4658 *Klebsiella pneumoniae* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4152 *Escherichia coli* gntV THERMOSENSITIVE GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 6013 *Escherichia coli* gntK THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 2095 *Enterococcus faecium* (DOE) GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 718 *Corynebacterium diphtheriae* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
 2_7_1_12 4000 *Bacillus subtilis* gntK GLUCONOKINASE (EC 2_7_1_12)

2_7_1_130 7622 *Yersinia pseudotuberculosis* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 274 *Yersinia pestis* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 5673 *Vibrio cholerae* El Tor N16961 ORF02370 TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 2426 *Salmonella typhimurium* lpxK TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 2237 *Salmonella typhi* TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 2316 *Salmonella paratyphi* TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 2635 *Salmonella enteritidis* TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 6344 *Pseudomonas aeruginosa* lpxK TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 493 *Porphyromonas gingivalis* EC-ycsH PROBABLE TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 1681 *Pasteurella multocida* lpxK TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 637 *Neisseria gonorrhoeae* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 3001 *Klebsiella pneumoniae* TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 315 *Helicobacter pylori* J99tr[Q9ZMB1] PROBABLE TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 18129 *Haemophilus influenzae* HI0059 TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 1397 *Haemophilus ducreyi* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 881 *Escherichia coli* ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 223 *Chlamydia pneumoniae* AR39 CP0223 TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 417 *Campylobacter jejuni* lpxK PROBABLE TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 2451 *Bordetella pertussis* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_130 6246 *Bordetella bronchiseptica* EC-ycsH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
 2_7_1_144 6436 *Yersinia pseudotuberculosis* EC-agaZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3933 *Yersinia pestis* EC-agaZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 422 *Streptococcus pyogenes* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 610 *Streptococcus pyogenes* lacC_2 TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 137 *Streptococcus pneumoniae* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 1827 *Streptococcus pneumoniae* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 104 *Streptococcus mutans* [P26421] TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 542 *Streptococcus equi* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 2822 *Staphylococcus aureus* [P11099] TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3849 *Salmonella typhimurium* gatZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3101 *Salmonella typhi* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3102 *Salmonella typhi* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 5803 *Salmonella paratyphi* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 5804 *Salmonella paratyphi* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3676 *Salmonella enteritidis* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 2340 *Klebsiella pneumoniae* TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 3056 *Escherichia coli* agaZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 5275 *Escherichia coli* gatZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 1877 *Enterococcus faecium* (DOE) TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 2226 *Enterococcus faecalis* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 948 *Clostridium difficile* TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 2748 *Clostridium difficile* EC-agaZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_144 1918 *Clostridium acetobutylicum* 667218_C3_41 TAGATOSE-6-PHOSPHATE KINASE (EC 2_7_1_144)
 2_7_1_15 4407 *Yersinia pseudotuberculosis* BS-rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5200 *Yersinia pseudotuberculosis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 6100 *Yersinia pseudotuberculosis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 823 *Yersinia pestis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2459 *Yersinia pestis* EC-rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4154 *Yersinia pestis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 6650 *Vibrio cholerae* El Tor N16961ORFA01060 RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1292 *Staphylococcus aureus* EC-rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2732 *Staphylococcus aureus* EC-yeiI RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2192 *Salmonella typhimurium* rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3197 *Salmonella typhimurium* yihV RIBOKINASE (EC 2_7_1_15)

2_7_1_15 4242 *Salmonella typhimurium* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4670 *Salmonella typhimurium* yegV RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5721 *Salmonella typhimurium* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5926 *Salmonella typhimurium*trjQ9Z4S5 TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1069 *Salmonella typhi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1197 *Salmonella typhi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2725 *Salmonella typhi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2943 *Salmonella typhi* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3827 *Salmonella typhi* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4499 *Salmonella typhi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5780 *Salmonella typhi* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1643 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1645 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2776 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5075 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5765 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5766 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 6196 *Salmonella paratyphi* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 533 *Salmonella enteritidis* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1401 *Salmonella enteritidis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1870 *Salmonella enteritidis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4299 *Salmonella enteritidis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5080 *Salmonella enteritidis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1069 *Salmonella dublin* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1657 *Salmonella dublin* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3046 *Salmonella dublin* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4183 *Salmonella dublin* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1932 *Saccharomyces cerevisiae* RBK1 RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 6122 *Pseudomonas aeruginosa* rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 570 *Pasteurella multocida* rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 208 *Mycobacterium tuberculosis* cbhK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1099 *Mycobacterium tuberculosis* rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 501 *Mycobacterium leprae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2389 *Mycobacterium bovis* EC-yhfQ RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4920 *Mycobacterium bovis* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4150 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4151 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4465 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 4466 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 6196 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 7693 *Klebsiella pneumoniae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 631 *Helicobacter pylori* J99trjQ9ZLE9 RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 1061 *Haemophilus influenzae* HI0505 RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2048 *Escherichia coli* b2100 RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2109 *Escherichia coli* yeiI RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3671 *Escherichia coli* rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3782 *Escherichia coli* yihV RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 5317 *Escherichia coli* yeiC RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2850 *Enterococcus faecium* (DOE) RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 346 *Enterococcus faecalis* EC-rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 2864 *Enterococcus faecalis* TRANSCRIPTIONAL REGULATOR, deoR FAMILY / RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 226 *Corynebacterium diphtheriae* RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 300 *Clostridium difficile* EC-rbsK RIBOKINASE (EC 2_7_1_15)
 2_7_1_15 3587 *Bacillus subtilis* rbsK RIBOKINASE (EC 2_7_1_15)

2_7_1_16 5545 *Yersinia pseudotuberculosis* EC-araB L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 1547 *Yersinia pestis* EC-araB L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 2994 *Staphylococcus aureus* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 294 *Salmonella typhimurium* araB L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 914 *Salmonella typhi* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 277 *Salmonella paratyphi* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 278 *Salmonella paratyphi* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 1715 *Salmonella paratyphi* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 1717 *Salmonella paratyphi* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 3860 *Salmonella enteritidis* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 1565 *Salmonella dublin* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 3785 *Klebsiella pneumoniae* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 3786 *Klebsiella pneumoniae* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 3787 *Klebsiella pneumoniae* L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 4313 *Escherichia coli* araB L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_16 2873 *Bacillus subtilis* araB L-RIBULOKINASE (EC 2_7_1_16)
 2_7_1_19 4335 *Yersinia pseudotuberculosis* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 3838 *Yersinia pestis* EC-prkB PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 6362 *Vibrio cholerae* El Tor N16961 ORF03306 PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 3992 *Salmonella typhimurium* prkB PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 2429 *Salmonella typhi* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 4848 *Salmonella paratyphi* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 3228 *Salmonella enteritidis* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 2825 *Salmonella dublin* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 5094 *Klebsiella pneumoniae* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_19 6648 *Escherichia coli* prkB PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
 2_7_1_2 4784 *Yersinia pseudotuberculosis* EC-yajF GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4792 *Yersinia pseudotuberculosis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 803 *Yersinia pestis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3136 *Yersinia pestis* EC-yajF GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 5283 *Yersinia pestis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4147 *Vibrio cholerae* El Tor N16961 ORF00377 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 5344 *Vibrio cholerae* El Tor N16961 ORF01959 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 992 *Streptococcus pyogenes* EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1023 *Streptococcus pyogenes* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1447 *Streptococcus pyogenes* glcK GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 118 *Streptococcus pneumoniae* EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 251 *Streptococcus pneumoniae* EC-yhcl GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1714 *Streptococcus pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 433 *Streptococcus mutans* BS-glcK GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 135 *Streptococcus equi* BS-glcK GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1164 *Streptococcus equi* EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1697 *Streptococcus equi* EC-yhcl GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1077 *Staphylococcus aureus* BS-glcK GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2867 *Staphylococcus aureus* EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2203 *Salmonella typhimurium* yajF GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2258 *Salmonella typhimurium* ycfX GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6072 *Salmonella typhimurium* glk GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6830 *Salmonella typhimurium* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 145 *Salmonella typhi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2302 *Salmonella typhi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2672 *Salmonella typhi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4570 *Salmonella typhi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1020 *Salmonella paratyphi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3472 *Salmonella paratyphi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4638 *Salmonella paratyphi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4639 *Salmonella paratyphi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6986 *Salmonella paratyphi* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1750 *Salmonella enteritidis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1759 *Salmonella enteritidis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3869 *Salmonella enteritidis* GLUCOKINASE (EC 2_7_1_2)

2_7_1_2 3884 *Salmonella enteritidis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3112 *Salmonella dublin* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4919 *Saccharomyces cerevisiae* GLK1 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 4925 *Saccharomyces cerevisiae* YDR516C GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 5785 *Pseudomonas aeruginosa* glk GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1574 *Porphyromonas gingivalis* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1575 *Porphyromonas gingivalis* BS-glck GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 51 *Pasteurella multocida* EC-yajF GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1610 *Pasteurella multocida* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 20415 *Neurospora crassa* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 568 *Neisseria gonorrhoeae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 5545 *Mycobacterium tuberculosis* Rv0650 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2100 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2101 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6594 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6595 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6604 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 6605 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 8562 *Klebsiella pneumoniae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 504 *Helicobacter pylori* HP1103 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1019 *Helicobacter pylori* J99tr/Q9ZKB0 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 422 *Haemophilus influenzae* HI0182 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 378 *Escherichia coli* yajF GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1081 *Escherichia coli* b1119 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 5456 *Escherichia coli* glk GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 603 *Enterococcus faecium* (DOE) EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2396 *Enterococcus faecium* (DOE) GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1455 *Enterococcus faecalis* BS-glck GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1269 *Corynebacterium diphtheriae* GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3211 *Clostridium difficile* BS-glck GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 3719 *Clostridium difficile* EC-nagC GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 495 *Clostridium acetobutylicum* 24806713_C2_65 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 1869 *Clostridium acetobutylicum* 20430327_C2_32 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 169 *Borrelia burgdorferi* BB0831 GLUCOKINASE (EC 2_7_1_2)
 2_7_1_2 2480 *Bacillus subtilis* glck GLUCOKINASE (EC 2_7_1_2)
 2_7_1_26 8052 *Yersinia pseudotuberculosis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 3832 *Yersinia pestis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 493 *Ureaplasma urealyticum* UU355 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 666 *Treponema pallidum* TP0888 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 681 *Streptococcus pyogenes* mreA RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1465 *Streptococcus pneumoniae* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1853 *Streptococcus mutans* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 13 *Streptococcus equi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE
 (EC 2_7_7_2)
 2_7_1_26 2663 *Staphylococcus aureus* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 5767 *Salmonella typhimurium* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 4732 *Salmonella typhi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE
 (EC 2_7_7_2)
 2_7_1_26 2866 *Salmonella paratyphi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1824 *Saccharomyces cerevisiae* FMN1 MONOFUNCTIONAL RIBOFLAVIN KINASE (EC 2_7_1_26)
 2_7_1_26 4167 *Pseudomonas aeruginosa* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)

2_7_1_26 1607 Porphyromonas gingivalis EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 767 Pasteurella multocida ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 334 Neisseria gonorrhoeae EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 674 Mycoplasma pneumoniae MP674 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1366 Mycoplasma genitalium MG145 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 4232 Mycobacterium tuberculosis ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 2318 Mycobacterium leprae EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 518 Mycobacterium bovis EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 6239 Klebsiella pneumoniae RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 6240 Klebsiella pneumoniae RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 6241 Klebsiella pneumoniae RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 491 Helicobacter pylori HP1087 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 342 Helicobacter pylori J99 ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 19847 Haemophilus influenzae HI0963 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1444 Haemophilus ducreyi EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 25 Escherichia coli yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE
 (EC 2_7_7_2)
 2_7_1_26 3670 Enterococcus faecium (DOE) EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1322 Corynebacterium diphtheriae RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 2033 Clostridium difficile EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 3197 Clostridium acetobutylicum 2531502_F2_4 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 91 Chlamydia trachomatis D/UW-3/Cx EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 437 Chlamydia pneumoniae AR39 CP0437 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 287 Chlamydia pneumoniae CWL029 EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26); / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1403 Campylobacter jejuni ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 974 Bordetella pertussis EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 6588 Bordetella bronchiseptica EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 1667 Bacillus subtilis ribC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_1_26 2924 Bacillus subtilis ribR MONOFUNCTIONAL RIBOFLAVIN KINASE (EC 2_7_1_26)
 2_7_1_29 5021 Yersinia pseudotuberculosis DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 6227 Yersinia pseudotuberculosis DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 2692 Yersinia pestis DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 2693 Yersinia pestis DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 1209 Staphylococcus aureus DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 2416 Staphylococcus aureus DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 4574 Saccharomyces cerevisiae DAK1 DIHYDROXYACETONE KINASE (EC 2_7_1_29)

2_7_1_29 5059 *Saccharomyces cerevisiae* DAK2 DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 1053 *Pasteurella multocida* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 1054 *Pasteurella multocida* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 3670 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 3671 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 3672 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 5554 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 5555 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 5556 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 5557 *Klebsiella pneumoniae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 4811 *Escherichia coli* b1199 DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 4812 *Escherichia coli* b1200 DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 1935 *Enterococcus faecium* (DOE) DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 1939 *Enterococcus faecium* (DOE) DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 480 *Enterococcus faecalis* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 481 *Enterococcus faecalis* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 2116 *Corynebacterium diphtheriae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_29 2360 *Corynebacterium diphtheriae* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
 2_7_1_31 5010 *Yersinia pseudotuberculosis* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1491 *Yersinia pestis* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 7409 *Vibrio cholerae* El Tor N16961ORFA00642 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 495 *Streptococcus pyogenes* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1335 *Streptococcus pneumoniae* EC-yhaD GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 904 *Streptococcus mutans* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1985 *Staphylococcus aureus* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2791 *Salmonella typhimurium* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 4589 *Salmonella typhimurium* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 6610 *Salmonella typhimurium* glxK GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 653 *Salmonella typhi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1542 *Salmonella typhi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1738 *Salmonella typhi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2144 *Salmonella typhi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3518 *Salmonella paratyphi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3651 *Salmonella paratyphi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 4042 *Salmonella paratyphi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 5621 *Salmonella paratyphi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 6935 *Salmonella paratyphi* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2476 *Salmonella enteritidis* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2779 *Salmonella enteritidis* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3845 *Salmonella enteritidis* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3846 *Salmonella enteritidis* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3092 *Salmonella dublin* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3736 *Salmonella dublin* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 4456 *Salmonella dublin* GLYCERATE KINASE 2 (EC 2_7_1_31)
 2_7_1_31 4524 *Salmonella dublin* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3144 *Pseudomonas aeruginosa* PA1499 glycerate kinase (EC 2_7_1_31)
 2_7_1_31 5403 *Pseudomonas aeruginosa* PA1052 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 643 *Porphyromonas gingivalis* EC-yhaD GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1104 *Pasteurella multocida* PM1741 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2209 *Neisseria gonorrhoeae* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 211 *Mycobacterium tuberculosis* Rv2205c GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2385 *Mycobacterium bovis* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2080 *Klebsiella pneumoniae* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3083 *Klebsiella pneumoniae* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 8443 *Klebsiella pneumoniae* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 21688 *Haemophilus influenzae* HI0091 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 497 *Escherichia coli* b0514 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 5839 *Escherichia coli* yhaD GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 2096 *Enterococcus faecium* (DOE) GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 229 *Enterococcus faecalis* EC-yhaD GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 66 *Corynebacterium diphtheriae* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 968 *Clostridium difficile* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)

2_7_1_31 1280 *Clostridium acetobutylicum* 792086_C3_57 GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 1039 *Bordetella pertussis* EC-yhaD GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 7594 *Bordetella bronchiseptica* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 7595 *Bordetella bronchiseptica* GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_31 3998 *Bacillus subtilis* yxaA GLYCERATE KINASE (EC 2_7_1_31)
 2_7_1_33 5823 *Yersinia pseudotuberculosis* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 2180 *Yersinia pestis* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 4195 *Vibrio cholerae* El Tor N16961 ORF00450 PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1295 *Streptococcus pyogenes* coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1874 *Streptococcus pneumoniae* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 542 *Streptococcus mutans* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1247 *Streptococcus equi* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 3263 *Staphylococcus aureus* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1850 *Salmonella typhimurium* panK PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 970 *Salmonella typhi* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 5014 *Salmonella paratyphi* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 766 *Salmonella enteritidis* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 2908 *Salmonella dublin* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 4057 *Saccharomyces cerevisiae* YDR531W PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1110 *Pasteurella multocida* coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 4257 *Mycobacterium tuberculosis* coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 2050 *Mycobacterium leprae* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 2439 *Mycobacterium bovis* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 877 *Klebsiella pneumoniae* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 8696 *Klebsiella pneumoniae* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 13313 *Haemophilus influenzae* HI0631 PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1281 *Haemophilus ducreyi* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 5736 *Escherichia coli* yggC PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 6271 *Escherichia coli* coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 758 *Enterococcus faecalis* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 1600 *Corynebacterium diphtheriae* PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_33 2372 *Bacillus subtilis* yqjS PANTOTHENATE KINASE (EC 2_7_1_33)
 2_7_1_39 7400 *Yersinia pseudotuberculosis* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 2353 *Yersinia pestis* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 6130 *Vibrio cholerae* El Tor N16961 ORF02992 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1308 *Streptococcus pneumoniae* EC-thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 194 *Streptococcus equi* BS-thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 3759 *Salmonella typhimurium* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 3635 *Salmonella typhi* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 229 *Salmonella paratyphi* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 2631 *Salmonella enteritidis* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 6924 *Saccharomyces cerevisiae* THR1 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1464 *Pseudomonas aeruginosa* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 5146 *Pseudomonas aeruginosa* thrH PHOSPHOSERINE PHOSPHATASE (EC 3_1_3_3) /
 HOMOSERINE KINASE (2_7_1_39)
 2_7_1_39 471 *Pasteurella multocida* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1479 *Neisseria gonorrhoeae* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 911 *Mycobacterium tuberculosis* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1198 *Mycobacterium leprae* P45836 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1565 *Mycobacterium bovis* EC-thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 3562 *Klebsiella pneumoniae* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 454 *Helicobacter pylori* HP1050 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 378 *Helicobacter pylori* J99 thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 18062 *Haemophilus influenzae* HI0088 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 3 *Escherichia coli* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 2511 *Enterococcus faecalis* EC-thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 1381 *Corynebacterium diphtheriae* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 2148 *Clostridium difficile* BS-thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 3245 *Clostridium acetobutylicum* 24111512_C1_7 HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 812 *Campylobacter jejuni* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 2958 *Bordetella pertussis* HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_39 8739 *Bordetella bronchiseptica* HOMOSERINE KINASE (EC 2_7_1_39)

2_7_1_39 3219 *Bacillus subtilis* thrB HOMOSERINE KINASE (EC 2_7_1_39)
 2_7_1_4 7162 *Vibrio cholerae* El Tor N16961ORFA00335 FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 276 *Streptococcus pyogenes* scrK FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 530 *Streptococcus pneumoniae* BS-ydhR FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 130 *Streptococcus mutans* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 828 *Streptococcus equi* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3424 *Staphylococcus aureus* strQ53645 FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 810 *Salmonella typhimurium* scrK FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 2561 *Salmonella typhimurium* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 4596 *Salmonella typhimurium* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 1756 *Salmonella typhi* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 2213 *Salmonella typhi* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3860 *Salmonella paratyphi* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 5795 *Salmonella paratyphi* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3045 *Salmonella enteritidis* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 4234 *Salmonella enteritidis* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 2946 *Salmonella dublin* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3370 *Salmonella dublin* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 4702 *Pseudomonas aeruginosa* mtlZ FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 1123 *Pasteurella multocida* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3115 *Klebsiella pneumoniae* FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3292 *Escherichia coli* yhfQ FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3194 *Enterococcus faecium* (DOE) FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3214 *Enterococcus faecium* (DOE) EC-yhfQ FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 980 *Enterococcus faecalis* BS-ydhR FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 1055 *Clostridium difficile* BS-ydJE FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 129 *Clostridium acetobutylicum* 29851500_C1_110 FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 600 *Clostridium acetobutylicum* 23634638_C1_43 FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3141 *Clostridium acetobutylicum* 24640686_C1_15 FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 586 *Bacillus subtilis* ydhR FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 617 *Bacillus subtilis* ydJE FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_4 3252 *Bacillus subtilis* yurL FRUCTOKINASE (EC 2_7_1_4)
 2_7_1_45 5998 *Yersinia pseudotuberculosis* EC-kdGK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 1460 *Yersinia pestis* EC-kdGK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 130 *Streptococcus pyogenes* kdGK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 725 *Streptococcus pneumoniae* BS-iolC 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 562 *Streptococcus equi* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 1099 *Streptococcus equi* BS-iolC 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 6836 *Salmonella typhimurium* kdGK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 3360 *Salmonella typhi* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 2278 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 4479 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 3837 *Salmonella enteritidis* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 4177 *Salmonella enteritidis* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 1023 *Salmonella dublin* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 4368 *Salmonella dublin* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 2607 *Pseudomonas aeruginosa* PA2261 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 2319 *Klebsiella pneumoniae* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 5779 *Klebsiella pneumoniae* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 18143 *Haemophilus influenzae* HI0049 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 3446 *Escherichia coli* kdGK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 5091 *Escherichia coli* b1772 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 2270 *Enterococcus faecium* (DOE) 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 80 *Enterococcus faecalis* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 394 *Enterococcus faecalis* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 1305 *Enterococcus faecalis* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 2943 *Clostridium difficile* 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 296 *Clostridium acetobutylicum* 23642213_C2_89 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_45 1040 *Clostridium acetobutylicum* 4117142_F3_32 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)

2_7_1_45 2208 *Bacillus subtilis* kdgK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
 2_7_1_49 5490 *Yersinia pseudotuberculosis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 6974 *Yersinia pseudotuberculosis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 4524 *Yersinia pestis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 5121 *Vibrio cholerae* El Tor N16961 ORF01679 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 433 *Treponema pallidum* TP0115 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 263 *Streptococcus pyogenes* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 801 *Streptococcus pneumoniae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 908 *Streptococcus pneumoniae* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1284 *Streptococcus mutans* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 619 *Streptococcus equi* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1541 *Staphylococcus aureus* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2178 *Staphylococcus aureus* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 933 *Salmonella typhimurium* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 4597 *Salmonella typhi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1640 *Salmonella paratyphi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7); HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1641 *Salmonella paratyphi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7); HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 288 *Salmonella enteritidis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2121 *Salmonella dublin* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7); HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 3682 *Pseudomonas aeruginosa* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1259 *Porphyromonas gingivalis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3) / PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49) / THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_7_1_49 201 *Pasteurella multocida* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1577 *Neisseria gonorrhoeae* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 5000 *Mycobacterium tuberculosis* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1945 *Mycobacterium lepraes* Q9ZBL1 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2112 *Mycobacterium bovis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 3408 *Klebsiella pneumoniae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 266 *Helicobacter pylori* HP0844 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 781 *Helicobacter pylori* J99sp|Q9ZL00 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 4519 *Haemophilus influenzae* HI0416 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 5280 *Escherichia coli* b2103 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)

2_7_1_49 1180 *Enterococcus faecium* (DOE) PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2536 *Enterococcus faecium* (DOE) PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1443 *Enterococcus faecalis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2776 *Enterococcus faecalis* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2947 *Enterococcus faecalis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1778 *Corynebacterium diphtheriae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1247 *Clostridium difficile* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1374 *Clostridium acetobutylicum* 7235943_C2_37 PHOSPHOMETHYLPYRIMIDINE KINASE (EC
 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 2885 *Campylobacter jejuni* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 108 *Bordetella pertussis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 3746 *Bordetella pertussis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 5606 *Bordetella bronchiseptica* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 7781 *Bordetella bronchiseptica* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 1172 *Bacillus subtilis* yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_49 3795 *Bacillus subtilis* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_1_5 7798 *Yersinia pseudotuberculosis* EC-rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 410 *Yersinia pestis* EC-rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 1526 *Streptococcus pneumoniae* EC-rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 787 *Salmonella typhimurium* rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 372 *Salmonella typhi* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 5120 *Salmonella paratyphi* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 722 *Salmonella enteritidis* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 2534 *Klebsiella pneumoniae* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 2535 *Klebsiella pneumoniae* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 2536 *Klebsiella pneumoniae* RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 6242 *Escherichia coli* rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 3543 *Enterococcus faecium* (DOE) RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 1297 *Enterococcus faecalis* EC-rhaB RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_5 3114 *Bacillus subtilis* yuIC RHAMNULOKINASE (EC 2_7_1_5)
 2_7_1_50 910 *Streptococcus pneumoniae* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 916 *Streptococcus pneumoniae* BS-thiK HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 932 *Salmonella typhimurium* thiM HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 4598 *Salmonella typhi* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1637 *Salmonella paratyphi* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1638 *Salmonella paratyphi* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 2120 *Salmonella dublin* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 6728 *Saccharomyces cerevisiae* THI6 THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC
 2_5_1_3) / HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 202 *Pasteurella multocida* thiM HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1617 *Klebsiella pneumoniae* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1618 *Klebsiella pneumoniae* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 267 *Helicobacter pylori* HP0845 HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 782 *Helicobacter pylori* J99spJQ9ZK29 HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 890 *Haemophilus influenzae* HI0415 HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 5281 *Escherichia coli* b2104 HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1445 *Enterococcus faecalis* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 1248 *Clostridium difficile* BS-thiK HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)

2_7_1_50 1375 *Clostridium acetobutylicum* 23462812_CI_30 HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_50 3823 *Bacillus subtilis* thiK HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
 2_7_1_51 6863 *Salmonella typhimurium* fucK L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 3854 *Salmonella typhi* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 6002 *Salmonella paratyphi* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 6004 *Salmonella paratyphi* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 2951 *Salmonella enteritidis* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 4976 *Klebsiella pneumoniae* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 4978 *Klebsiella pneumoniae* L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 20633 *Haemophilus influenzae* HI0613 L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_51 2734 *Escherichia coli* fucK L-FUCULOKINASE (EC 2_7_1_51)
 2_7_1_53 376 *Salmonella paratyphi* CRYPTIC L-XYLULOSE KINASE (EC 2_7_1_53)
 2_7_1_53 4148 *Klebsiella pneumoniae* CRYPTIC L-XYLULOSE KINASE (EC 2_7_1_53)
 2_7_1_53 3500 *Escherichia coli* lyxK L-XYLULOSE KINASE (EC 2_7_1_53)
 2_7_1_55 6308 *Escherichia coli* yjcT D-ALLOSE KINASE (EC 2_7_1_55)
 2_7_1_56 4389 *Yersinia pseudotuberculosis* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3645 *Yersinia pestis* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 7023 *Vibrio cholerae* El Tor N16961ORFA00161 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1217 *Streptococcus pyogenes* fruB 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 831 *Streptococcus pneumoniae* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1096 *Streptococcus mutans* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1333 *Streptococcus mutans* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 259 *Streptococcus equi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 2625 *Staphylococcus aureus* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 2047 *Salmonella typhimurium* fpk 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3842 *Salmonella typhimurium* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1047 *Salmonella typhi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 4173 *Salmonella typhi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 448 *Salmonella paratyphi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 449 *Salmonella paratyphi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 450 *Salmonella paratyphi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 5799 *Salmonella paratyphi* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 755 *Salmonella enteritidis* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 631 *Pseudomonas aeruginosa* fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3 *Pasteurella multocida* fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 77 *Mycoplasma pneumoniae* MP076 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1190 *Mycoplasma genitalium* MG063 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1892 *Klebsiella pneumoniae* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3832 *Klebsiella pneumoniae* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3833 *Klebsiella pneumoniae* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 13706 *Haemophilus influenzae* HI0447 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 5319 *Escherichia coli* fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 2287 *Enterococcus faecium* (DOE) 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 357 *Enterococcus faecalis* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1888 *Enterococcus faecalis* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 724 *Corynebacterium diphtheriae* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 82 *Clostridium difficile* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 976 *Clostridium difficile* 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 3093 *Clostridium acetobutylicum* 34656317_F2_1 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 129 *Borrelia burgdorferi* BB0630 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 401 *Bordetella pertussis* EC-yhfQ 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 6536 *Bordetella bronchiseptica* EC-yhfQ 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_56 1440 *Bacillus subtilis* fruB 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
 2_7_1_58 5842 *Salmonella typhimurium* dgoK 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
 2_7_1_58 4110 *Salmonella enteritidis* 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
 2_7_1_58 3834 *Salmonella dublin* 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
 2_7_1_58 7194 *Klebsiella pneumoniae* 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
 2_7_1_58 6151 *Escherichia coli* yidV 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
 2_7_1_60 56 *Yersinia pestis* EC-yhcI N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 5579 *Vibrio cholerae* El Tor N16961 ORF02263 N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 6108 *Salmonella typhimurium* yhcI N-acetylmannosamine kinase (EC 2_7_1_60)

2_7_1_60 557 *Salmonella typhi* N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 2840 *Salmonella paratyphi* N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 4096 *Salmonella enteritidis* N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 1081 *Pasteurella multocida* EC-yhcI N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 17947 *Haemophilus influenzae* HI0144 N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 5884 *Escherichia coli* yhcI N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_60 1843 *Corynebacterium diphtheriae* UDP-N-acetylglucosamine-2-epimerase (EC 5_1_3_14) /N-acetylmannosamine kinase (EC 2_7_1_60)
 2_7_1_63 1471 *Mycobacterium tuberculosis* ppgK POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_63 1087 *Mycobacterium lepraes* pQ49988 POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_63 2056 *Mycobacterium leprae* POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_63 825 *Mycobacterium bovis* POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_63 826 *Mycobacterium bovis* EC-yhcI POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_63 890 *Corynebacterium diphtheriae* POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
 2_7_1_66 4913 *Yersinia pseudotuberculosis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 3511 *Yersinia pestis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 4392 *Vibrio cholerae* El Tor N16961 ORF00735 BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 1569 *Streptococcus pyogenes* bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 1014 *Streptococcus pneumoniae* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 1404 *Streptococcus mutans* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 1768 *Staphylococcus aureus* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2014 *Salmonella typhimurium* bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 5348 *Salmonella typhi* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2134 *Salmonella paratyphi* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 3075 *Salmonella dublin* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2807 *Pseudomonas aeruginosa* bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 103 *Porphyromonas gingivalis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 182 *Neisseria gonorrhoeae* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2434 *Mycobacterium tuberculosis* Rv2136c BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 957 *Mycobacterium leprae* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2273 *Mycobacterium bovis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 4839 *Klebsiella pneumoniae* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 5813 *Klebsiella pneumoniae* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 5814 *Klebsiella pneumoniae* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 5811 *Escherichia coli* bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2521 *Enterococcus faecium* (DOE) BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2738 *Enterococcus faecalis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 1615 *Corynebacterium diphtheriae* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)

2_7_1_66 2265 *Clostridium difficile* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2285 *Clostridium difficile* BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 378 *Clostridium acetobutylicum* 26777052_F2_77 BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 3171 *Clostridium acetobutylicum* 556630_C1_9 BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 2134 *Campylobacter jejuni* bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 787 *Borrelia burgdorferi* BB0258 BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 4154 *Bordetella pertussis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 8439 *Bordetella bronchiseptica* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_66 3109 *Bacillus subtilis* yubB BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
 2_7_1_69 4239 *Yersinia pseudotuberculosis* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4242 *Yersinia pseudotuberculosis* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 4749 *Yersinia pseudotuberculosis* EC-agaV PTS SYSTEM, N-ACETYLGLACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 5193 *Yersinia pseudotuberculosis* BS-ypqE PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5259 *Yersinia pseudotuberculosis* EC-ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5597 *Yersinia pseudotuberculosis* EC-fruB PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 6037 *Yersinia pseudotuberculosis* EC-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6655 *Yersinia pseudotuberculosis* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6657 *Yersinia pseudotuberculosis* EC-celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6887 *Yersinia pseudotuberculosis* BS-treP PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7409 *Yersinia pseudotuberculosis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 7410 *Yersinia pseudotuberculosis* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 7891 *Yersinia pseudotuberculosis* EC-frwD PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 7892 *Yersinia pseudotuberculosis* EC-frwB PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 735 *Yersinia pestis* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 770 *Yersinia pestis* BS-ypqE PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1117 *Yersinia pestis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1150 *Yersinia pestis* EC-frwD PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 1151 *Yersinia pestis* EC-frwB PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 1279 *Yersinia pestis* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 1838 *Yersinia pestis* EC-celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2177 *Yersinia pestis* EC-nagE PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2666 *Yersinia pestis* EC-mtIA PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3482 *Yersinia pestis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)

2_7_1_69 3483 *Yersinia pestis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 3754 *Yersinia pestis* EC-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3931 *Yersinia pestis* EC-agaV PTS SYSTEM, N-ACETYL GALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 4116 *Yersinia pestis* BS-treP PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4295 *Yersinia pestis* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4581 *Yersinia pestis* EC-ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5197 *Yersinia pestis* EC-fruB PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 21 *Vibrio cholerae* El Tor N16961 ORF03202 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 79 *Vibrio cholerae* El Tor N16961 ORF01317 PTS SYSTEM, N-ACETYL GLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4756 *Vibrio cholerae* El Tor N16961 ORF01209 PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4797 *Vibrio cholerae* El Tor N16961 ORF01273 PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5106 *Vibrio cholerae* El Tor N16961 ORF01664 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5108 *Vibrio cholerae* El Tor N16961 ORF01666 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5620 *Vibrio cholerae* El Tor N16961 ORF02308 PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 5808 *Vibrio cholerae* El Tor N16961 ORF02543 PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6760 *Vibrio cholerae* El Tor N16961 ORFA01197 PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 7022 *Vibrio cholerae* El Tor N16961 ORFA00160 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7024 *Vibrio cholerae* El Tor N16961 ORFA00162 PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 7159 *Vibrio cholerae* El Tor N16961 ORFA00332 PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7545 *Vibrio cholerae* El Tor N16961 ORFA00816 PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 368 *Treponema pallidum* TP0038 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 405 *Treponema pallidum* TP0085 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 488 *Treponema pallidum* TP0755 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 50 *Streptococcus pyogenes* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 51 *Streptococcus pyogenes* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 90 *Streptococcus pyogenes* EC-nagE PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 169 *Streptococcus pyogenes* lacE PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 346 *Streptococcus pyogenes* lacF PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 394 *Streptococcus pyogenes* EC-ascF PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 427 *Streptococcus pyogenes* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 507 *Streptococcus pyogenes* EC-treB PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 644 *Streptococcus pyogenes* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 645 *Streptococcus pyogenes* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 718 *Streptococcus pyogenes* EC-celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 719 *Streptococcus pyogenes* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 842 *Streptococcus pyogenes* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 881 *Streptococcus pyogenes* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 895 *Streptococcus pyogenes* EC-ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 896 *Streptococcus pyogenes* EC-yjIT UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1011 *Streptococcus pyogenes* agaV PTS SYSTEM, N-ACETYLGALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 1013 *Streptococcus pyogenes* agaF PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1049 *Streptococcus pyogenes* manL PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1087 *Streptococcus pyogenes* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1218 *Streptococcus pyogenes* BS-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1895 *Streptococcus pyogenes* scrA PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 9 *Streptococcus pneumoniae* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 30 *Streptococcus pneumoniae* PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 32 *Streptococcus pneumoniae* BS-mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 40 *Streptococcus pneumoniae* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 142 *Streptococcus pneumoniae* PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 143 *Streptococcus pneumoniae* PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 220 *Streptococcus pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 221 *Streptococcus pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 481 *Streptococcus pneumoniae* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 482 *Streptococcus pneumoniae* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 493 *Streptococcus pneumoniae* EC-bglF PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 531 *Streptococcus pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 532 *Streptococcus pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 559 *Streptococcus pneumoniae* EC-treB PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 591 *Streptococcus pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 593 *Streptococcus pneumoniae* BS-licA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 693 *Streptococcus pneumoniae* EC-nagE PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 832 *Streptococcus pneumoniae* EC-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)

2_7_1_69 981 *Streptococcus pneumoniae* EC-malX PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1050 *Streptococcus pneumoniae* EC-ptxA UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)
 2_7_1_69 1051 *Streptococcus pneumoniae* EC-yjfT UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1228 *Streptococcus pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1232 *Streptococcus pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1238 *Streptococcus pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1239 *Streptococcus pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1324 *Streptococcus pneumoniae* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1430 *Streptococcus pneumoniae* PTS SYSTEM, FRUCTOSE-LIKE-1 IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1431 *Streptococcus pneumoniae* PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 1432 *Streptococcus pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1450 *Streptococcus pneumoniae* PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1452 *Streptococcus pneumoniae* PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1529 *Streptococcus pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1530 *Streptococcus pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1583 *Streptococcus pneumoniae* EC-yadI PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1585 *Streptococcus pneumoniae* EC-agaV PTS SYSTEM, N-ACETYL GALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 80 *Streptococcus mutans* sp|P50976 PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 106 *Streptococcus mutans* sp|P26426 PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 120 *Streptococcus mutans* sp|Q02420 PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 133 *Streptococcus mutans* sp|P12655 PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 201 *Streptococcus mutans* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 779 *Streptococcus mutans* EC-mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 844 *Streptococcus mutans* str|Q9X675 PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 927 *Streptococcus mutans* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1014 *Streptococcus mutans* EC-nagE PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1022 *Streptococcus mutans* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1032 *Streptococcus mutans* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1094 *Streptococcus mutans* EC-ptsN PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1095 *Streptococcus mutans* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1116 *Streptococcus mutans* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1147 *Streptococcus mutans* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)

2_7_1_69 1148 *Streptococcus mutans* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1334 *Streptococcus mutans* BS-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1344 *Streptococcus mutans* EC-yjft UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1345 *Streptococcus mutans* EC-ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 1527 *Streptococcus mutans* strQ9X676 PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1557 *Streptococcus mutans* EC-ireB PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2138 *Streptococcus mutans* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 145 *Streptococcus equi* EC-ascF PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 155 *Streptococcus equi* BS-treP PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 222 *Streptococcus equi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 223 *Streptococcus equi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 258 *Streptococcus equi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 495 *Streptococcus equi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 496 *Streptococcus equi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 640 *Streptococcus equi* EC-agaV PTS SYSTEM, N-ACETYLGALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 741 *Streptococcus equi* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 765 *Streptococcus equi* EC-nagE PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1232 *Streptococcus equi* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1233 *Streptococcus equi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1283 *Streptococcus equi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1288 *Streptococcus equi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1296 *Streptococcus equi* EC-ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 1297 *Streptococcus equi* EC-yjft UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1403 *Streptococcus equi* EC-celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1404 *Streptococcus equi* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1462 *Streptococcus equi* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1466 *Streptococcus equi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1659 *Streptococcus equi* EC-ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1890 *Streptococcus equi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 364 *Staphylococcus aureus* PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1068 *Staphylococcus aureus* BS-ybbF PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1157 *Staphylococcus aureus* EC-glvC PTS SYSTEM, ARBUTIN-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1605 *Staphylococcus aureus* BS-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1691 *Staphylococcus aureus* BS-ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT GLCA (EC 2_7_1_69)
 2_7_1_69 1943 *Staphylococcus aureus* PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1971 *Staphylococcus aureus* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)

2_7_1_69 1991 *Staphylococcus aureus* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2030 *Staphylococcus aureus* PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2039 *Staphylococcus aureus* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2221 *Staphylococcus aureus* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2267 *Staphylococcus aureus* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2326 *Staphylococcus aureus* BS-treP PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2363 *Staphylococcus aureus* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2659 *Staphylococcus aureus* EC-gatB PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2792 *Staphylococcus aureus* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2824 *Staphylococcus aureus* PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3195 *Staphylococcus aureus* EC-frvB PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3305 *Staphylococcus aureus* EC-ptxA PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3731 *Staphylococcus aureus* EC-mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3823 *Staphylococcus aureus* EC-malX PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 336 *Salmonella typhimurium* crr PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 806 *Salmonella typhimurium* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1180 *Salmonella typhimurium* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1242 *Salmonella typhimurium* sp|P17127 PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 1440 *Salmonella typhimurium* pstN PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1687 *Salmonella typhimurium* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1894 *Salmonella typhimurium* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2048 *Salmonella typhimurium* fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2081 *Salmonella typhimurium* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2392 *Salmonella typhimurium* rpoP NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 2640 *Salmonella typhimurium* sgaB UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 2704 *Salmonella typhimurium* frwB PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT I (EC 2_7_1_69)
 2_7_1_69 3534 *Salmonella typhimurium* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3843 *Salmonella typhimurium* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3846 *Salmonella typhimurium* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 3850 *Salmonella typhimurium* gatA PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3851 *Salmonella typhimurium* gatB PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4366 *Salmonella typhimurium* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4367 *Salmonella typhimurium* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)

2_7_1_69 4371 *Salmonella typhimurium* ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4509 *Salmonella typhimurium* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4864 *Salmonella typhimurium* srlE PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4867 *Salmonella typhimurium* gutB PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5213 *Salmonella typhimurium* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5343 *Salmonella typhimurium* yfcC PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5344 *Salmonella typhimurium* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 5468 *Salmonella typhimurium* manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5509 *Salmonella typhimurium* treB PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5962 *Salmonella typhimurium* mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6180 *Salmonella typhimurium* celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6184 *Salmonella typhimurium* celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6327 *Salmonella typhimurium* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6328 *Salmonella typhimurium* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6786 *Salmonella typhimurium* ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 6787 *Salmonella typhimurium* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 6802 *Salmonella typhimurium* frwD PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 6977 *Salmonella typhimurium* sgcA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 7075 *Salmonella typhimurium* PTS SYSTEM, N-ACETYLGALUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 329 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 782 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 796 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 814 *Salmonella typhi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 937 *Salmonella typhi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 938 *Salmonella typhi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 939 *Salmonella typhi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1048 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1815 *Salmonella typhi* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2692 *Salmonella typhi* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2929 *Salmonella typhi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 2975 *Salmonella typhi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2976 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3103 *Salmonella typhi* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3104 *Salmonella typhi* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3222 *Salmonella typhi* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4238 *Salmonella typhi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4599 *Salmonella typhi* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4665 *Salmonella typhi* PTS SYSTEM, N-ACETYLGALUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)

2_7_1_69 4978 *Salmonella typhi* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 5038 *Salmonella typhi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5151 *Salmonella typhi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5183 *Salmonella typhi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 5184 *Salmonella typhi* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5212 *Salmonella typhi* PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5377 *Salmonella typhi* NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 5656 *Salmonella typhi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 5657 *Salmonella typhi* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 16 *Salmonella paratyphi* PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 422 *Salmonella paratyphi* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 423 *Salmonella paratyphi* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 447 *Salmonella paratyphi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 1439 *Salmonella paratyphi* PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1454 *Salmonella paratyphi* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1455 *Salmonella paratyphi* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1873 *Salmonella paratyphi* NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 1904 *Salmonella paratyphi* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1905 *Salmonella paratyphi* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1906 *Salmonella paratyphi* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2026 *Salmonella paratyphi* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 2295 *Salmonella paratyphi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2297 *Salmonella paratyphi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2298 *Salmonella paratyphi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2299 *Salmonella paratyphi* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2464 *Salmonella paratyphi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3167 *Salmonella paratyphi* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3563 *Salmonella paratyphi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 4712 *Salmonella paratyphi* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4713 *Salmonella paratyphi* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4780 *Salmonella paratyphi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4782 *Salmonella paratyphi* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 4810 *Salmonella paratyphi* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4811 *Salmonella paratyphi* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4946 *Salmonella paratyphi* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 5164 *Salmonella paratyphi* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5188 *Salmonella paratyphi* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 5800 *Salmonella paratyphi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5801 *Salmonella paratyphi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5802 *Salmonella paratyphi* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 5805 *Salmonella paratyphi* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5806 *Salmonella paratyphi* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6307 *Salmonella paratyphi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6308 *Salmonella paratyphi* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6990 *Salmonella paratyphi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 394 *Salmonella enteritidis* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 528 *Salmonella enteritidis* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 628 *Salmonella enteritidis* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 660 *Salmonella enteritidis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 754 *Salmonella enteritidis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1127 *Salmonella enteritidis* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1387 *Salmonella enteritidis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1422 *Salmonella enteritidis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1423 *Salmonella enteritidis* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 1574 *Salmonella enteritidis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1778 *Salmonella enteritidis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2338 *Salmonella enteritidis* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2423 *Salmonella enteritidis* PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 2489 *Salmonella enteritidis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2559 *Salmonella enteritidis* NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 2682 *Salmonella enteritidis* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2787 *Salmonella enteritidis* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2788 *Salmonella enteritidis* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3117 *Salmonella enteritidis* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3746 *Salmonella enteritidis* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3774 *Salmonella enteritidis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4280 *Salmonella enteritidis* PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 302 *Salmonella dublin* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 420 *Salmonella dublin* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 632 *Salmonella dublin* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 782 *Salmonella dublin* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1653 *Salmonella dublin* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1963 *Salmonella dublin* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2378 *Salmonella dublin* NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 2543 *Salmonella dublin* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2734 *Salmonella dublin* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 2941 *Salmonella dublin* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2942 *Salmonella dublin* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3555 *Salmonella dublin* PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 3861 *Salmonella dublin* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4291 *Salmonella dublin* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 1357 *Pseudomonas aeruginosa* fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5425 *Pseudomonas aeruginosa* PA3761 PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6596 *Pseudomonas aeruginosa* PA3760 PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7804 *Pseudomonas aeruginosa* ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 2 *Pasteurella multocida* fruB PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 4 *Pasteurella multocida* fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 16 *Pasteurella multocida* BS-ybbF PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 85 *Pasteurella multocida* ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 217 *Pasteurella multocida* EC-ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 802 *Pasteurella multocida* ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1120 *Pasteurella multocida* ptsB PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1219 *Pasteurella multocida* EC-srlB PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1220 *Pasteurella multocida* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1675 *Pasteurella multocida* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1697 *Pasteurella multocida* EC-nagE PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1717 *Pasteurella multocida* crr PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1799 *Pasteurella multocida* ptmA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 756 *Neisseria gonorrhoeae* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 1717 *Neisseria gonorrhoeae* EC-manX PTS SYSTEM, IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 78 *Mycoplasma pneumoniae* EC-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 190 *Mycoplasma pneumoniae* P75145 PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 192 *Mycoplasma pneumoniae* BS-mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 349 *Mycoplasma pneumoniae* EC-ptxA UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)
 2_7_1_69 625 *Mycoplasma pneumoniae* ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 127 *Mycoplasma genitalium* MG062 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 144 *Mycoplasma genitalium* MG069 PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 205 *Klebsiella pneumoniae* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 346 *Klebsiella pneumoniae* NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 352 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 358 *Klebsiella pneumoniae* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 724 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 725 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 730 *Klebsiella pneumoniae* PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 778 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 924 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)

2_7_1_69 1456 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1457 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1544 *Klebsiella pneumoniae* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1546 *Klebsiella pneumoniae* PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1570 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1571 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1787 *Klebsiella pneumoniae* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1893 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1894 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1895 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2341 *Klebsiella pneumoniae* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2342 *Klebsiella pneumoniae* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2415 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3035 *Klebsiella pneumoniae* PTS SYSTEM, ARBUTIN-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3429 *Klebsiella pneumoniae* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3431 *Klebsiella pneumoniae* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3432 *Klebsiella pneumoniae* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3594 *Klebsiella pneumoniae* PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3641 *Klebsiella pneumoniae* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3642 *Klebsiella pneumoniae* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3643 *Klebsiella pneumoniae* PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3675 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3676 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 3677 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-LIKE-1 IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3831 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3834 *Klebsiella pneumoniae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 3928 *Klebsiella pneumoniae* PTS SYSTEM, ARBUTIN-, CELLOBIOSE-, AND SALICIN-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3929 *Klebsiella pneumoniae* PTS SYSTEM, ARBUTIN-, CELLOBIOSE-, AND SALICIN-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4079 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4080 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4081 *Klebsiella pneumoniae* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4082 *Klebsiella pneumoniae* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4115 *Klebsiella pneumoniae* PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5646 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5650 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6463 *Klebsiella pneumoniae* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 7041 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 7049 *Klebsiella pneumoniae* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7050 *Klebsiella pneumoniae* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7100 *Klebsiella pneumoniae* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 7229 *Klebsiella pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 7230 *Klebsiella pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 7231 *Klebsiella pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 7248 *Klebsiella pneumoniae* PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 7509 *Klebsiella pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 7510 *Klebsiella pneumoniae* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 7690 *Klebsiella pneumoniae* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 8208 *Klebsiella pneumoniae* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 8214 *Klebsiella pneumoniae* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 8215 *Klebsiella pneumoniae* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 8377 *Klebsiella pneumoniae* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 8944 *Klebsiella pneumoniae* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 9030 *Klebsiella pneumoniae* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 12193 *Haemophilus influenzae* HII147 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 17348 *Haemophilus influenzae* HI0446 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 18316 *Haemophilus influenzae* HII711 PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 20967 *Haemophilus influenzae* HI0448 PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 207 *Haemophilus ducreyi* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 402 *Haemophilus ducreyi* EC-ptxA PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 1151 *Haemophilus ducreyi* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1404 *Haemophilus ducreyi* BS-ypqE PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 129 *Escherichia coli* yadI PTS SYSTEM, IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 653 *Escherichia coli* nagE PTS SYSTEM, N-ACETYLGLUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 705 *Escherichia coli* hrsA HRSA PROTEIN (EC 2_7_1_69)
 2_7_1_69 1063 *Escherichia coli* ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1580 *Escherichia coli* malX PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1774 *Escherichia coli* manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2358 *Escherichia coli* crr PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2369 *Escherichia coli* b2429 PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2631 *Escherichia coli* srlA_2 PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2632 *Escherichia coli* srlB PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2644 *Escherichia coli* ascF PTS SYSTEM, ARBUTIN-, CELLOBIOSE-, AND SALICIN-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)

2_7_1_69 3057 *Escherichia coli* agaV PTS SYSTEM, N-ACETYL GALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 3062 *Escherichia coli* agaB PTS SYSTEM, N-ACETYL GALACTOSAMINE-SPECIFIC IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 3127 *Escherichia coli* ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 3519 *Escherichia coli* mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3848 *Escherichia coli* frwB PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 1 (EC 2_7_1_69)
 2_7_1_69 3851 *Escherichia coli* frwD PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 4077 *Escherichia coli* yjft UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 5071 *Escherichia coli* celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5073 *Escherichia coli* celA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5273 *Escherichia coli* gatB PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5274 *Escherichia coli* gatA PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5318 *Escherichia coli* fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5320 *Escherichia coli* fruB PTS SYSTEM, FRUCTOSE-SPECIFIC IIA/FPR COMPONENT (EC 2_7_1_69)
 2_7_1_69 5455 *Escherichia coli* b2387 PTS SYSTEM, FRUCTOSE-LIKE IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 5741 *Escherichia coli* cmtA PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 5742 *Escherichia coli* cmtB PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6143 *Escherichia coli* glvB PTS SYSTEM, ARBUTIN-LIKE IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 6164 *Escherichia coli* bgfI PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6237 *Escherichia coli* frvB PTS SYSTEM, FRUCTOSE-LIKE-1 IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6427 *Escherichia coli* yjhL PUTATIVE PHOSPHOTRANSFERASE ENZYME II, A COMPONENT SGCA (EC 2_7_1_69)
 2_7_1_69 6485 *Escherichia coli* ptxA UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)
 2_7_1_69 6494 *Escherichia coli* treB PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 6612 *Escherichia coli* frvA PTS SYSTEM, FRUCTOSE-LIKE-1 IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6714 *Escherichia coli* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 526 *Enterococcus faecium* (DOE) PTS SYSTEM, FRUCTOSE-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 791 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIA B COMPONENT (EC 2_7_1_69)
 2_7_1_69 822 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1141 *Enterococcus faecium* (DOE) PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1296 *Enterococcus faecium* (DOE) PTS SYSTEM, SUCROSE-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1362 *Enterococcus faecium* (DOE) UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1432 *Enterococcus faecium* (DOE) PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1436 *Enterococcus faecium* (DOE) PTS SYSTEM, FRUCTOSE-SPECIFIC IIA BC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1531 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIA B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1537 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIA B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1578 *Enterococcus faecium* (DOE) PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)

2_7_1_69 1601 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1603 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1699 *Enterococcus faecium* (DOE) PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1707 *Enterococcus faecium* (DOE) PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1881 *Enterococcus faecium* (DOE) PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1883 *Enterococcus faecium* (DOE) PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1958 *Enterococcus faecium* (DOE) PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2027 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2300 *Enterococcus faecium* (DOE) EC-frvB PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2370 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2447 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2450 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2565 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2570 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2588 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2589 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2867 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2924 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2950 *Enterococcus faecium* (DOE) PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2955 *Enterococcus faecium* (DOE) PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2962 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2981 *Enterococcus faecium* (DOE) UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 3022 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3023 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3083 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3087 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3093 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3095 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3112 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3178 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3311 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 3521 *Enterococcus faecium* (DOE) PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3532 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3653 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 3654 *Enterococcus faecium* (DOE) PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3759 *Enterococcus faecium* (DOE) PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3777 *Enterococcus faecium* (DOE) PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3822 *Enterococcus faecium* (DOE) PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3893 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3909 *Enterococcus faecium* (DOE) UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 3932 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4057 *Enterococcus faecium* (DOE) PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 4061 *Enterococcus faecium* (DOE) PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 11 *Enterococcus faecalis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 70 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 155 *Enterococcus faecalis* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 185 *Enterococcus faecalis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 FRAMESHIFT
 2_7_1_69 186 *Enterococcus faecalis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 219 *Enterococcus faecalis* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 241 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 242 *Enterococcus faecalis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 246 *Enterococcus faecalis* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 272 *Enterococcus faecalis* PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 329 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 341 *Enterococcus faecalis* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 342 *Enterococcus faecalis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 355 *Enterococcus faecalis* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 356 *Enterococcus faecalis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 388 *Enterococcus faecalis* PTS SYSTEM, N-ACETYL GALACTOSAMINE-SPECIFIC IIB COMPONENT 2 (EC 2_7_1_69)
 2_7_1_69 591 *Enterococcus faecalis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 639 *Enterococcus faecalis* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 640 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 670 *Enterococcus faecalis* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 828 *Enterococcus faecalis* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 829 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 856 *Enterococcus faecalis* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1059 *Enterococcus faecalis* PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1229 *Enterococcus faecalis* EC-manX PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1230 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1317 *Enterococcus faecalis* PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)

2_7_1_69 1318 *Enterococcus faecalis* BS-mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1319 *Enterococcus faecalis* PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1321 *Enterococcus faecalis* PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1404 *Enterococcus faecalis* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1410 *Enterococcus faecalis* BS-ybbF PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1501 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1502 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1660 *Enterococcus faecalis* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1889 *Enterococcus faecalis* BS-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1907 *Enterococcus faecalis* PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1915 *Enterococcus faecalis* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1927 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1928 *Enterococcus faecalis* EC-yadI PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1969 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1970 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2175 *Enterococcus faecalis* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)
 2_7_1_69 2177 *Enterococcus faecalis* EC-yjft UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 2221 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2224 *Enterococcus faecalis* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2326 *Enterococcus faecalis* EC-treB PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2327 *Enterococcus faecalis* PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2406 *Enterococcus faecalis* PTS SYSTEM, SUCROSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2592 *Enterococcus faecalis* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2654 *Enterococcus faecalis* EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2655 *Enterococcus faecalis* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2675 *Enterococcus faecalis* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2696 *Enterococcus faecalis* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2697 *Enterococcus faecalis* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2698 *Enterococcus faecalis* EC-srlB PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2724 *Enterococcus faecalis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2737 *Enterococcus faecalis* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 657 *Corynebacterium diphtheriae* PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 698 *Corynebacterium diphtheriae* PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 722 *Corynebacterium diphtheriae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 723 *Corynebacterium diphtheriae* PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 81 *Clostridium difficile* BS-fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)

2_7_1_69 108 Clostridium difficile EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 187 Clostridium difficile EC-glvc PTS SYSTEM, ARBUTIN-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 193 Clostridium difficile PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 194 Clostridium difficile PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 314 Clostridium difficile PTS SYSTEM, MANNOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 500 Clostridium difficile BS-treP PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 565 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 569 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 662 Clostridium difficile PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 906 Clostridium difficile PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 907 Clostridium difficile PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT I (EC 2_7_1_69)
 2_7_1_69 941 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 942 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 963 Clostridium difficile PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 966 Clostridium difficile EC-hrsA HRSA PROTEIN (EC 2_7_1_69)
 2_7_1_69 970 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 972 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 977 Clostridium difficile PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1075 Clostridium difficile UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 1076 Clostridium difficile PTS SYSTEM, MANNITOL (CRYPTIC)-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1122 Clostridium difficile PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1250 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1328 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1375 Clostridium difficile PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1377 Clostridium difficile EC-srIB PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1483 Clostridium difficile PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1486 Clostridium difficile PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1590 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1869 Clostridium difficile BS-ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2122 Clostridium difficile EC-celC PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2123 Clostridium difficile PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2224 Clostridium difficile PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2247 Clostridium difficile PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2249 Clostridium difficile PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2316 Clostridium difficile NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 2410 Clostridium difficile PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2411 Clostridium difficile PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2675 Clostridium difficile PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2676 Clostridium difficile PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2681 Clostridium difficile PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2683 Clostridium difficile EC-mtIA PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2735 Clostridium difficile PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2749 Clostridium difficile EC-fwB PTS SYSTEM, FRUCTOSE-LIKE-2 IIB COMPONENT I (EC 2_7_1_69)

2_7_1_69 2776 *Clostridium difficile* PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2777 *Clostridium difficile* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2842 *Clostridium difficile* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, A COMPONENT (EC 2_7_1_69)
 2_7_1_69 2843 *Clostridium difficile* UNKNOWN PENTITOL PHOSPHOTRANSFERASE ENZYME II, B COMPONENT (EC 2_7_1_69)
 2_7_1_69 2899 *Clostridium difficile* PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2901 *Clostridium difficile* PTS SYSTEM, SORBOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2908 *Clostridium difficile* PTS SYSTEM, GALACTITOL-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2935 *Clostridium difficile* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2936 *Clostridium difficile* PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3104 *Clostridium difficile* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3107 *Clostridium difficile* PTS SYSTEM, GLUCITOL/SORBITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3349 *Clostridium difficile* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3490 *Clostridium difficile* PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3504 *Clostridium difficile* EC-malX PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 16 *Clostridium acetobutylicum* 24407802_F1_19 PTS SYSTEM, MALTOSE AND GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 18 *Clostridium acetobutylicum* 13859675_F3_96 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 308 *Clostridium acetobutylicum* 11953327_C1_69 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 309 *Clostridium acetobutylicum* 20898438_C3_104 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 601 *Clostridium acetobutylicum* 20508588_C1_42 PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 924 *Clostridium acetobutylicum* 25625325_C1_39 PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 948 *Clostridium acetobutylicum* 22274567_C3_41 PTS SYSTEM, ARBUTIN-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1510 *Clostridium acetobutylicum* 36225010_C2_41 PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1511 *Clostridium acetobutylicum* 36605258_C3_50 PTS SYSTEM, FRUCTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 1721 *Clostridium acetobutylicum* 22276875_C1_21 PTS SYSTEM, MANNOSE-SPECIFIC IIAB COMPONENT (EC 2_7_1_69)
 2_7_1_69 1782 *Clostridium acetobutylicum* 5895253_C1_14 PTS SYSTEM, N-ACETYLGALACTOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2184 *Clostridium acetobutylicum* 4790677_C3_23 PTS SYSTEM, MANNITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2186 *Clostridium acetobutylicum* 20602260_C2_20 PTS SYSTEM, MANNITOL-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2680 *Clostridium acetobutylicum* 24492152_F2_4 PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2915 *Clostridium acetobutylicum* 19634751_C2_12 PTS SYSTEM, GLUCOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3035 *Clostridium acetobutylicum* 19726512_F3_5 PTS SYSTEM, LACTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3036 *Clostridium acetobutylicum* 1992338_F2_3 PTS SYSTEM, LACTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3094 *Clostridium acetobutylicum* 34650050_F3_7 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3095 *Clostridium acetobutylicum* 2765703_F3_8 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)

2_7_1_69 3635 *Clostridium acetobutylicum* 36023433_F1_1 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3638 *Clostridium acetobutylicum* 16538135_F3_7 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3942 *Clostridium acetobutylicum* 31365831_F3_3 PTS SYSTEM, GALACTITOL-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 278 *Chlamydia trachomatis* D/UW-3/Cx ptsN_1 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 279 *Chlamydia trachomatis* D/UW-3/Cx ptsN_2 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 714 *Chlamydia pneumoniae* AR39 CP0714 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 715 *Chlamydia pneumoniae* AR39 CP0715 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 55 *Chlamydia pneumoniae* CWL029 ptsN_1 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 56 *Chlamydia pneumoniae* CWL029 ptsN_2 NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 115 *Borrelia burgdorferi* BB0645 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 130 *Borrelia burgdorferi* BB0629 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 197 *Borrelia burgdorferi* BB0559 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 340 *Borrelia burgdorferi* BB0408 PTS SYSTEM, FRUCTOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 617 *Borrelia burgdorferi* BB0116 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 975 *Borrelia burgdorferi* BBB05 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 976 *Borrelia burgdorferi* BBB06 PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 999 *Borrelia burgdorferi* BBB29 PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2650 *Bordetella pertussis* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 4109 *Bordetella pertussis* PTS SYSTEM, IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 5825 *Bordetella bronchiseptica* PTS SYSTEM, IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 6992 *Bordetella bronchiseptica* EC-ptsN NITROGEN REGULATORY IIA PROTEIN (EC 2_7_1_69)
 2_7_1_69 168 *Bacillus subtilis* ybbF PTS SYSTEM, SUCROSE-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 236 *Bacillus subtilis* ybfS PTS SYSTEM, N-ACETYLGUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 399 *Bacillus subtilis* mtlA PTS SYSTEM, MANNITOL-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 581 *Bacillus subtilis* ydhM PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 582 *Bacillus subtilis* ydhN PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 770 *Bacillus subtilis* yfIF PTS SYSTEM, N-ACETYLGUCOSAMINE-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 780 *Bacillus subtilis* treP PTS SYSTEM, TREHALOSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 820 *Bacillus subtilis* glvC PTS SYSTEM, ARBUTIN-LIKE IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1202 *Bacillus subtilis* yjdD PTS SYSTEM, FRUCTOSE-LIKE IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1390 *Bacillus subtilis* ptsG PTS SYSTEM, GLUCOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 1441 *Bacillus subtilis* fruA PTS SYSTEM, FRUCTOSE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 2220 *Bacillus subtilis* ypqE PTS SYSTEM, IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 2699 *Bacillus subtilis* levE PTS SYSTEM, FRUCTOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)
 2_7_1_69 2700 *Bacillus subtilis* levD PTS SYSTEM, FRUCTOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3798 *Bacillus subtilis* sacP PTS SYSTEM, SUCROSE-SPECIFIC IIBC COMPONENT (EC 2_7_1_69)
 2_7_1_69 3850 *Bacillus subtilis* licA PTS SYSTEM, CELLOBIOSE-SPECIFIC IIA COMPONENT (EC 2_7_1_69)
 2_7_1_69 3852 *Bacillus subtilis* licB PTS SYSTEM, CELLOBIOSE-SPECIFIC IIB COMPONENT (EC 2_7_1_69)

2_7_1_69 3920 *Bacillus subtilis* bgIP PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_69 4006 *Bacillus subtilis* yyzE PTS SYSTEM, BETA-GLUCOSIDES-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
 2_7_1_71 4441 *Yersinia pseudotuberculosis* EC-aroK SHIKIMATE KINASE I (EC 2_7_1_71)
 2_7_1_71 5736 *Yersinia pseudotuberculosis* EC-aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 286 *Yersinia pestis* EC-aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 552 *Yersinia pestis* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 6378 *Vibrio cholerae* El Tor N16961 ORF03325 SHIKIMATE KINASE I (EC 2_7_1_71)
 2_7_1_71 1369 *Streptococcus pyogenes* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 391 *Streptococcus pneumoniae* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 562 *Streptococcus mutans* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 803 *Streptococcus equi* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 2210 *Salmonella typhimurium* aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 5376 *Salmonella typhimurium* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 38 *Salmonella typhi* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1464 *Salmonella typhi* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1108 *Salmonella paratyphi* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 3146 *Salmonella paratyphi* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 3082 *Salmonella dublin* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 3745 *Pseudomonas aeruginosa* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1802 *Porphyromonas gingivalis* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 868 *Pasteurella multocida* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1379 *Neisseria gonorrhoeae* sp. O50467 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 134 *Mycobacterium tuberculosis* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 441 *Mycobacterium leprae* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1116 *Mycobacterium bovis* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 6589 *Klebsiella pneumoniae* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 6709 *Klebsiella pneumoniae* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 9253 *Klebsiella pneumoniae* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1111 *Helicobacter pylori* HP0157 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 149 *Helicobacter pylori* J99sp. Q9ZMS3 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 7676 *Haemophilus influenzae* HI0207 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 779 *Haemophilus ducreyi* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 372 *Escherichia coli* aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 5985 *Escherichia coli* aroK SHIKIMATE KINASE I (EC 2_7_1_71)
 2_7_1_71 2439 *Enterococcus faecium* (DOE) SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 2193 *Enterococcus faecalis* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 746 *Corynebacterium diphtheriae* SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 2415 *Clostridium difficile* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 1756 *Clostridium acetobutylicum* 36218767_F3_13 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 349 *Chlamydia trachomatis* D/UW-3/Cx aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 814 *Chlamydia pneumoniae* AR39 CP0814 SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 960 *Chlamydia pneumoniae* CWL029 aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 2390 *Campylobacter jejuni* aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 4163 *Bordetella pertussis* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 8119 *Bordetella bronchiseptica* EC-aroK SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_71 316 *Bacillus subtilis* aroL SHIKIMATE KINASE (EC 2_7_1_71)
 2_7_1_73 4465 *Yersinia pseudotuberculosis* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 2770 *Yersinia pestis* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 4955 *Vibrio cholerae* El Tor N16961 ORF01473 INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 6565 *Salmonella typhimurium* gsk INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 2869 *Salmonella typhi* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 3530 *Salmonella paratyphi* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 1853 *Salmonella enteritidis* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 4693 *Salmonella dublin* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 5135 *Klebsiella pneumoniae* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 460 *Escherichia coli* gsk INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_73 3972 *Clostridium acetobutylicum* 22129386_F2_1 INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
 2_7_1_87 5727 *Salmonella typhi* STREPTOMYCIN 3"-KINASE (EC 2_7_1_87)
 2_7_1_87 3931 *Pseudomonas aeruginosa* str STREPTOMYCIN 3"-KINASE (EC 2_7_1_87)

2_7_1_90 93 *Treponema pallidum* TP0542 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 425 *Treponema pallidum* TP0108 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 946 *Porphyromonas gingivalis* PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 196 *Chlamydia trachomatis* D/UW-3/Cx pfkA_1 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 198 *Chlamydia trachomatis* D/UW-3/Cx pfkA_2 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 559 *Chlamydia pneumoniae* AR39 CP0559 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 611 *Chlamydia pneumoniae* AR39 CP0611 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 145 *Chlamydia pneumoniae* CWL029 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 146 *Chlamydia pneumoniae* CWL029 pfkA_1 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 189 *Chlamydia pneumoniae* CWL029 pfkA_2 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 40 *Borrelia burgdorferi* BB0727 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_90 711 *Borrelia burgdorferi* BB0020 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
 2_7_1_92 8176 *Yersinia pseudotuberculosis* BS-iolC 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_92 5219 *Yersinia pestis* BS-iolC 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_92 1220 *Salmonella typhimurium* 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_92 3050 *Klebsiella pneumoniae* 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_92 2499 *Enterococcus faecium* (DOE) BS-iolC 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_92 3967 *Bacillus subtilis* iolC 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
 2_7_1_95 524 *Streptococcus equi* PROBABLE AMINOGLYCOSIDE 3'-PHOSPHOTRANSFERASE (EC 2_7_1_95)
 2_7_1_95 2904 *Pseudomonas aeruginosa* aph AMINOGLYCOSIDE 3'-PHOSPHOTRANSFERASE (EC 2_7_1_95)
 2_7_1_95 3042 *Enterococcus faecium* (DOE) AMINOGLYCOSIDE 3'-PHOSPHOTRANSFERASE (EC 2_7_1_95)
 2_7_2_1 5604 *Yersinia pseudotuberculosis* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2618 *Yersinia pestis* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 4924 *Vibrio cholerae* El Tor N16961 ORF01438 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 624 *Ureaplasma urealyticum* UU484 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 194 *Treponema pallidum* TP0476 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1418 *Streptococcus pyogenes* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1057 *Streptococcus pneumoniae* BS-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 429 *Streptococcus mutans* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 584 *Streptococcus equi* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 826 *Staphylococcus aureus* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 3298 *Salmonella typhimurium* pduW ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 5414 *Salmonella typhimurium* ack ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 545 *Salmonella typhi* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2630 *Salmonella typhi* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1326 *Salmonella paratyphi* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1632 *Salmonella paratyphi* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 3066 *Salmonella paratyphi* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 108 *Rickettsia prowazekii* RP110 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1836 *Pseudomonas aeruginosa* PA1951 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 4073 *Pseudomonas aeruginosa* PA1763 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 8020 *Pseudomonas aeruginosa* PA0836 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1516 *Porphyromonas gingivalis* EC-yhaA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 833 *Pasteurella multocida* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 399 *Neisseria gonorrhoeae* EC-ackA ACETATE KINASE (EC 2_7_2_1)

2_7_2_1 1617 *Neisseria gonorrhoeae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 310 *Mycoplasma pneumoniae* MP309 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 4396 *Mycoplasma genitalium* MG357 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1815 *Mycobacterium tuberculosis* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 4110 *Mycobacterium bovis* BS-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2386 *Klebsiella pneumoniae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2387 *Klebsiella pneumoniae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2388 *Klebsiella pneumoniae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2745 *Klebsiella pneumoniae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1733 *Helicobacter pylori* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 837 *Helicobacter pylori* J99sp|Q9ZKU5 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 19374 *Haemophilus influenzae* H11204 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 972 *Haemophilus ducreyi* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2245 *Escherichia coli* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2707 *Enterococcus faecium* (DOE) ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2281 *Enterococcus faecalis* BS-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 829 *Corynebacterium diphtheriae* ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 3603 *Clostridium difficile* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 3355 *Clostridium acetobutylicum* 33603201_F1_2 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 88 *Campylobacter jejuni* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 137 *Borrelia burgdorferi* BB0622 ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 1496 *Bordetella pertussis* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 7994 *Bordetella bronchiseptica* EC-ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_1 2941 *Bacillus subtilis* ackA ACETATE KINASE (EC 2_7_2_1)
 2_7_2_2 1436 *Streptococcus pyogenes* arcC CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 717 *Streptococcus pneumoniae* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 1685 *Streptococcus mutans* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 829 *Streptococcus equi* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 1939 *Staphylococcus aureus* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 3456 *Staphylococcus aureus* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2469 *Salmonella typhimurium* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 6623 *Salmonella typhimurium* arcC CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 1043 *Salmonella typhi* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2558 *Salmonella typhi* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 646 *Salmonella paratyphi* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 647 *Salmonella paratyphi* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 1794 *Salmonella enteritidis* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 3703 *Salmonella enteritidis* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2502 *Salmonella dublin* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 5232 *Pseudomonas aeruginosa* arcC CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 530 *Mycoplasma pneumoniae* MP530 CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 13436 *Haemophilus influenzae* H10595 CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 307 *Escherichia coli* b0323 CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 504 *Escherichia coli* ybcF CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2798 *Escherichia coli* b2874 CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2781 *Enterococcus faecium* (DOE) CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 690 *Enterococcus faecalis* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 1758 *Enterococcus faecalis* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2251 *Enterococcus faecalis* tr|O54531 CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_2 2461 *Enterococcus faecalis* CARBAMATE KINASE (EC 2_7_2_2)
 2_7_2_4 5312 *Yersinia pseudotuberculosis* EC-lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 6039 *Yersinia pseudotuberculosis* EC-metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 7401 *Yersinia pseudotuberculosis* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE I (EC 1_1_1_3)
 2_7_2_4 2352 *Yersinia pestis* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC
 1_1_1_3)
 2_7_2_4 5186 *Yersinia pestis* EC-lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 5245 *Yersinia pestis* EC-metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 4266 *Vibrio cholerae* El Tor N16961 ORF00554 LYSINE-SENSITIVE ASPARTOKINASE III (EC
 2_7_2_4)

2_7_2_4 4409 *Vibrio cholerae* El Tor N1696I ORF0076I ASPARTOKINASE 2 (EC 2_7_2_4)
 2_7_2_4 6131 *Vibrio cholerae* El Tor N1696I ORF02994 ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 6432 *Vibrio cholerae* El Tor N1696I ORF03393 ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 1670 *Streptococcus pneumoniae* EC-thrA ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1672 *Streptococcus pneumoniae* ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1512 *Streptococcus mutans* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1396 *Staphylococcus aureus* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2387 *Staphylococcus aureus* ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 3297 *Salmonella typhimurium* pduV LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 3365 *Salmonella typhimurium* metM ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 3762 *Salmonella typhimurium* thrA2 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE I (EC 1_1_1_3)
 2_7_2_4 4854 *Salmonella typhimurium* apk LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 389 *Salmonella typhi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I (EC
 1_1_1_3)
 2_7_2_4 1334 *Salmonella typhi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II
 (EC 1_1_1_3)
 2_7_2_4 2629 *Salmonella typhi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 3161 *Salmonella typhi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 54 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I
 (EC 1_1_1_3)
 2_7_2_4 55 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I
 (EC 1_1_1_3)
 2_7_2_4 230 *Salmonella paratyphi* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I
 (EC 1_1_1_3)
 2_7_2_4 1327 *Salmonella paratyphi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 4368 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 4369 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 4371 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 4372 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 4373 *Salmonella paratyphi* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 5000 *Salmonella paratyphi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 5001 *Salmonella paratyphi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 5002 *Salmonella paratyphi* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1278 *Salmonella enteritidis* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 1466 *Salmonella enteritidis* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 3151 *Salmonella dublin* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE II
 (EC 1_1_1_3)
 2_7_2_4 3915 *Salmonella dublin* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 3980 *Saccharomyces cerevisiae* HOM3 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE I (EC 1_1_1_3)
 2_7_2_4 725 *Rickettsia prowazekii* RP753 ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2653 *Pseudomonas aeruginosa* lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 241 *Porphyromonas gingivalis* EC-lysC ASPARTOKINASE ALPHA AND BETA SUBUNITS (EC
 2_7_2_4)
 2_7_2_4 39 *Pasteurella multocida* EC-lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 472 *Pasteurella multocida* thrA ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE I (EC 1_1_1_3)
 2_7_2_4 733 *Neisseria gonorrhoeae* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 4370 *Mycobacterium tuberculosis* ask ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1881 *Mycobacterium leprae* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2365 *Mycobacterium leprae* ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 73 *Mycobacterium bovis* pP47731 ASPARTOKINASE (EC 2_7_2_4)

2_7_2_4 716 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 717 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1428 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1430 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 2295 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 2296 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 2297 *Klebsiella pneumoniae* ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC 1_1_1_3)
 2_7_2_4 2457 *Klebsiella pneumoniae* ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 I (EC 1_1_1_3)
 2_7_2_4 5523 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 8096 *Klebsiella pneumoniae* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 625 *Helicobacter pylori* HP1229 ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1140 *Helicobacter pylori* J99spJQ9ZJZ7 ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 6934 *Haemophilus influenzae* HI1632 LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 18061 *Haemophilus influenzae* HI0089 ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE I (EC 1_1_1_3)
 2_7_2_4 912 *Haemophilus ducreyi* EC-lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 2 *Escherichia coli* thrA ASPARTOKINASE I (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE I
 (EC 1_1_1_3)
 2_7_2_4 3838 *Escherichia coli* metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE DEHYDROGENASE
 II (EC 1_1_1_3)
 2_7_2_4 5492 *Escherichia coli* b2461 LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 6287 *Escherichia coli* lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1806 *Enterococcus faecium* (DOE) EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2210 *Enterococcus faecalis* EC-thrA LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 421 *Corynebacterium diphtheriae* ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1940 *Clostridium difficile* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2084 *Clostridium difficile* LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 3699 *Clostridium difficile* BS-dapG ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 1256 *Clostridium acetobutylicum* 7303427_F3_23 ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2810 *Clostridium acetobutylicum* 20351078_C2_16 ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 344 *Chlamydia trachomatis* D/UW-3/Cx lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC
 2_7_2_4)
 2_7_2_4 803 *Chlamydia pneumoniae* AR39 CP0803 LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 971 *Chlamydia pneumoniae* CWL029 lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1415 *Campylobacter jejuni* lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 2324 *Bordetella pertussis* BS-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 4376 *Bordetella pertussis* ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 7197 *Bordetella bronchiseptica* EC-lysC ASPARTOKINASE (EC 2_7_2_4)
 2_7_2_4 380 *Bacillus subtilis* yclM LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
 2_7_2_4 1676 *Bacillus subtilis* dapG ASPARTOKINASE I (EC 2_7_2_4)
 2_7_2_4 2841 *Bacillus subtilis* lysC ASPARTOKINASE 2 (EC 2_7_2_4)
 2_7_2_7 16 *Enterococcus faecalis* BS-yqiU BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 2729 *Clostridium difficile* BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 3116 *Clostridium difficile* BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 3566 *Clostridium difficile* BS-yqiU BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 1216 *Clostridium acetobutylicum* 23492127_C2_52 BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 2356 *Clostridium acetobutylicum* 9817175_F2_7 BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_7 2402 *Bacillus subtilis* yqiU BUTYRATE KINASE (EC 2_7_2_7)
 2_7_2_8 7306 *Yersinia pseudotuberculosis* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1384 *Yersinia pestis* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 6392 *Vibrio cholerae* El Tor N16961 ORF03341 ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1662 *Streptococcus mutans* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 2078 *Staphylococcus aureus* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 6800 *Salmonella typhimurium* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 6801 *Salmonella typhimurium* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1902 *Salmonella typhi* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 3902 *Salmonella paratyphi* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1677 *Salmonella enteritidis* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)

2_7_2_8 3693 *Salmonella dublin* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 4070 *Saccharomyces cerevisiae* ARG5,6 ACETYLGLUTAMATE KINASE (EC 2_7_2_8) / N-ACETYL-
 GAMMA-GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 2_7_2_8 6946 *Pseudomonas aeruginosa* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 549 *Pasteurella multocida* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 236 *Neurospora crassa* arg-6 ACETYLGLUTAMATE KINASE (EC 2_7_2_8) / N-ACETYL-GAMMA-
 GLUTAMYL-PHOSPHATE REDUCTASE (EC 1_2_1_38)
 2_7_2_8 997 *Neisseria gonorrhoeae* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 5043 *Mycobacterium tuberculosis* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 23 *Mycobacterium leprae* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1855 *Mycobacterium bovis* BS-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 7473 *Klebsiella pneumoniae* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 298 *Haemophilus ducreyi* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 3857 *Escherichia coli* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1488 *Corynebacterium diphtheriae* ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 475 *Clostridium difficile* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 900 *Clostridium acetobutylicum* 10581300_C3_82 ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 2150 *Campylobacter jejuni* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 3405 *Bordetella pertussis* BS-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 5930 *Bordetella bronchiseptica* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_2_8 1122 *Bacillus subtilis* argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
 2_7_3_3 1043 *Staphylococcus aureus* BS-yacI ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 2965 *Clostridium difficile* BS-yacI ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 1084 *Clostridium acetobutylicum* 23832312_C3_55 ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 644 *Chlamydia trachomatis* D/UW-3/Cx BS-yacI ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 45 *Chlamydia pneumoniae* AR39 CP0045 ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 645 *Chlamydia pneumoniae* CWL029 BS-yacI ARGININE KINASE (EC 2_7_3_3)
 2_7_3_3 85 *Bacillus subtilis* yacI ARGININE KINASE (EC 2_7_3_3)
 2_7_3_9 5194 *Yersinia pseudotuberculosis* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 7894 *Yersinia pseudotuberculosis* EC-ptsA PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)
 2_7_3_9 769 *Yersinia pestis* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC
 2_7_3_9)
 2_7_3_9 4695 *Yersinia pestis* EC-ptsA PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 PTSA (EC 2_7_3_9)
 2_7_3_9 4791 *Yersinia pestis* EC-ptsP PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 PTSP (EC 2_7_3_9)
 2_7_3_9 4530 *Vibrio cholerae* El Tor N16961 ORF00910 PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 4798 *Vibrio cholerae* El Tor N16961 ORF01275 PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1226 *Treponema pallidum* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC
 2_7_3_9)
 2_7_3_9 1348 *Streptococcus pyogenes* ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 (EC 2_7_3_9)
 2_7_3_9 1609 *Streptococcus pneumoniae* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 388 *Streptococcus mutans* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 (EC 2_7_3_9)
 2_7_3_9 255 *Streptococcus equi* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 (EC 2_7_3_9)
 2_7_3_9 1805 *Staphylococcus aureus* sp|P51183 PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 371 *Salmonella typhimurium* ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 (EC 2_7_3_9)
 2_7_3_9 571 *Salmonella typhimurium* ptsP PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE
 PTSP (EC 2_7_3_9)
 2_7_3_9 2701 *Salmonella typhimurium* ptsA PHOSPHOENOLPYRUVATE-PROTEIN
 PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)
 2_7_3_9 2101 *Salmonella typhi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC
 2_7_3_9)

2_7_3_9 4127 *Salmonella typhi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1435 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1436 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1437 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1438 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 3617 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 3618 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 1624 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 2177 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)
 2_7_3_9 2355 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 3342 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 4282 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)
 2_7_3_9 3274 *Salmonella dublin* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 4109 *Salmonella dublin* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)
 2_7_3_9 4590 *Pseudomonas aeruginosa* ptsP PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 1718 *Pasteurella multocida* ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1719 *Neisseria gonorrhoeae* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 216 *Mycoplasma pneumoniae* MP215 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 3253 *Mycoplasma genitalium* MG429 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 3592 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 3593 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 6781 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 6782 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 6783 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 9437 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 11011 *Haemophilus influenzae* H11712 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1405 *Haemophilus ducreyi* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 2357 *Escherichia coli* ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 5451 *Escherichia coli* b2383 PUTATIVE PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE YPDD (EC 2_7_3_9)
 2_7_3_9 5685 *Escherichia coli* ptsP PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSP (EC 2_7_3_9)
 2_7_3_9 6264 *Escherichia coli* ptsA PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE PTSA (EC 2_7_3_9)

2_7_3_9 291 *Enterococcus faecium* (DOE) PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 2749 *Enterococcus faecium* (DOE) PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1895 *Enterococcus faecalis* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 726 *Corynebacterium diphtheriae* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1461 *Clostridium difficile* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1366 *Clostridium acetobutylicum* 6814125_C3_44 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 321 *Chlamydia trachomatis* D/UW-3/Cx EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 737 *Chlamydia pneumoniae* AR39 CP0737 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 38 *Chlamydia pneumoniae* CWL029 EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 198 *Borrelia burgdorferi* BB0558 PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 4111 *Bordetella pertussis* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 8922 *Bordetella bronchiseptica* PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 9703 *Bordetella bronchiseptica* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_3_9 1392 *Bacillus subtilis* ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
 2_7_4_1 4919 *Yersinia pseudotuberculosis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 5972 *Yersinia pseudotuberculosis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 763 *Yersinia pestis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 3526 *Yersinia pestis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 4578 *Vibrio cholerae* El Tor N16961 ORF00979 POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 4701 *Vibrio cholerae* El Tor N16961 ORF01132 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 162 *Treponema pallidum* TP0441 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 1526 *Salmonella typhimurium* ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 3803 *Salmonella typhimurium* yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 3523 *Salmonella typhi* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 5268 *Salmonella typhi* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 2175 *Salmonella paratyphi* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 4704 *Salmonella paratyphi* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 3074 *Salmonella enteritidis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 4266 *Salmonella enteritidis* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 2523 *Saccharomyces cerevisiae* UTR1 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 2810 *Saccharomyces cerevisiae* YEL041W POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 1056 *Pseudomonas aeruginosa* ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1344 *Pseudomonas aeruginosa* PA3088 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 627 *Porphyromonas gingivalis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1589 *Porphyromonas gingivalis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
 2_7_4_1 1369 *Pasteurella multocida* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)

2_7_4_1 920 *Neisseria gonorrhoeae* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1134 *Neisseria gonorrhoeae* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 3560 *Mycobacterium tuberculosis* Rv1695 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 5956 *Mycobacterium tuberculosis* ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1063 *Mycobacterium leprae* spJQ49897 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 3819 *Mycobacterium leprae* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 2744 *Mycobacterium bovis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 2745 *Mycobacterium bovis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 8566 *Klebsiella pneumoniae* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 8568 *Klebsiella pneumoniae* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 8569 *Klebsiella pneumoniae* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 416 *Helicobacter pylori* HP1010 POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 783 *Helicobacter pylori* HP1394 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 415 *Helicobacter pylori* J99 ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1421 *Helicobacter pylori* J99 jhp1433 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 14494 *Haemophilus influenzae* HI0072 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 447 *Haemophilus ducreyi* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 2441 *Escherichia coli* ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 2551 *Escherichia coli* yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 446 *Enterococcus faecalis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 706 *Corynebacterium diphtheriae* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 583 *Clostridium difficile* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 1668 *Clostridium acetobutylicum* 26209387_C1_28 POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 2292 *Clostridium acetobutylicum* 5120952_F2_10 POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 3307 *Clostridium acetobutylicum* 20090925_C2_9 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 4007 *Clostridium acetobutylicum* 4038502_F3_2 POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 22 *Campylobacter jejuni* Cj0641 POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 284 *Campylobacter jejuni* ppk POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 1874 *Borrelia burgdorferi* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 1876 *Borrelia burgdorferi* POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 1019 *Bordetella pertussis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 1827 *Bordetella pertussis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 3785 *Bordetella pertussis* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 7668 *Bordetella bronchiseptica* POLYPHOSPHATE KINASE (EC 2_7_4_1)
 2_7_4_1 8242 *Bordetella bronchiseptica* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_1 1162 *Bacillus subtilis* yjbN POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD+ KINASE (EC 2_7_1_23)
 2_7_4_16 7439 *Yersinia pseudotuberculosis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 2735 *Yersinia pestis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 6040 *Vibrio cholerae* El Tor N16961 ORF02870 THIAMINE-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 920 *Salmonella typhimurium* thiL THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 828 *Salmonella typhi* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 5046 *Salmonella paratyphi* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 534 *Salmonella dublin* THIAMINE-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 6659 *Pseudomonas aeruginosa* thiL THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 494 *Porphyromonas gingivalis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)

2_7_4_16 858 *Pasteurella multocida* thiL THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 281 *Neisseria gonorrhoeae* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 797 *Mycobacterium tuberculosis* thiL THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 2269 *Mycobacterium leprae* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 3037 *Mycobacterium bovis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 1097 *Klebsiella pneumoniae* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 1098 *Klebsiella pneumoniae* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 1099 *Klebsiella pneumoniae* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 6377 *Haemophilus influenzae* H11305 THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 770 *Haemophilus ducreyi* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 401 *Escherichia coli* b0417 THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 1930 *Corynebacterium diphtheriae* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 2355 *Corynebacterium diphtheriae* THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 2957 *Campylobacter jejuni* thiL THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 3713 *Bordetella pertussis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 8925 *Bordetella bronchiseptica* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_16 590 *Bacillus subtilis* ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
 2_7_4_7 5490 *Yersinia pseudotuberculosis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 6974 *Yersinia pseudotuberculosis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 4524 *Yersinia pestis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 5121 *Vibrio cholerae* El Tor N16961 ORF01679 PHOSPHOMETHYLPYRIMIDINE KINASE (EC
 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 433 *Treponema pallidum* TP0115 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 263 *Streptococcus pyogenes* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 801 *Streptococcus pneumoniae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 908 *Streptococcus pneumoniae* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1284 *Streptococcus mutans* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 619 *Streptococcus equi* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1541 *Staphylococcus aureus* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2178 *Staphylococcus aureus* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 933 *Salmonella typhimurium* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 4597 *Salmonella typhi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1640 *Salmonella paratyphi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7);
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1641 *Salmonella paratyphi* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7);
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 288 *Salmonella enteritidis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2121 *Salmonella dublin* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7);
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 6755 *Saccharomyces cerevisiae* THI22 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 TRANSCRIPTIONAL ACTIVATOR TENA
 2_7_4_7 7886 *Saccharomyces cerevisiae* THI20 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 TRANSCRIPTIONAL ACTIVATOR TENA
 2_7_4_7 8374 *Saccharomyces cerevisiae* THI21 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 TRANSCRIPTIONAL ACTIVATOR TENA
 2_7_4_7 3682 *Pseudomonas aeruginosa* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) /
 HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)

2_7_4_7 1259 *Porphyromonas gingivalis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3) / PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49) / THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC 2_5_1_3)
 2_7_4_7 201 *Pasteurella multocida* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 152 *Neurospora crassa* BAA21049_1 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / TRANSCRIPTIONAL ACTIVATOR TENA
 2_7_4_7 1577 *Neisseria gonorrhoeae* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 5000 *Mycobacterium tuberculosis* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1945 *Mycobacterium leprae* sp|Q9ZBL1 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2112 *Mycobacterium bovis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 3408 *Klebsiella pneumoniae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 266 *Helicobacter pylori* HP0844 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 781 *Helicobacter pylori* J99sp|Q9ZL00 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 4519 *Haemophilus influenzae* HI0416 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 5280 *Escherichia coli* b2103 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1180 *Enterococcus faecium* (DOE) PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2536 *Enterococcus faecium* (DOE) PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1443 *Enterococcus faecalis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2776 *Enterococcus faecalis* BS-thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2947 *Enterococcus faecalis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1778 *Corynebacterium diphtheriae* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1247 *Clostridium difficile* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1374 *Clostridium acetobutylicum* 7235943_C2_37 PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 2885 *Campylobacter jejuni* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 108 *Bordetella pertussis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 3746 *Bordetella pertussis* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 5606 *Bordetella bronchiseptica* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 7781 *Bordetella bronchiseptica* PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 1172 *Bacillus subtilis* yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_4_7 3795 *Bacillus subtilis* thiD PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
 2_7_6_2 985 *Streptococcus pyogenes* BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 706 *Streptococcus pneumoniae* THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 1039 *Streptococcus mutans* BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 1021 *Streptococcus equi* BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 1085 *Staphylococcus aureus* BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 4782 *Saccharomyces cerevisiae* THI80 THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 1722 *Neisseria gonorrhoeae* THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)

2_7_6_2 3509 *Enterococcus faecium* (DOE) BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 241 *Bordetella pertussis* THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_2 7686 *Bordetella bronchiseptica* THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)
 2_7_6_3 6004 *Yersinia pseudotuberculosis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 4151 *Yersinia pestis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 4391 *Vibrio cholerae* El Tor N16961 ORF00734 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 4452 *Vibrio cholerae* El Tor N16961 ORF00815 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 945 *Streptococcus pyogenes* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 612 *Streptococcus pneumoniae* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3) / DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
 2_7_6_3 635 *Streptococcus equi* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 1987 *Salmonella typhimurium* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2691 *Salmonella typhi* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 5840 *Salmonella paratyphi* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2877 *Salmonella enteritidis* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2576 *Salmonella dublin* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2347 *Saccharomyces cerevisiae* FOL1 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2175 *Pseudomonas aeruginosa* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2503 *Pseudomonas aeruginosa* PA0583 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 106 *Porphyromonas gingivalis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 1686 *Pasteurella multocida* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 24 *Neisseria gonorrhoeae* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2978 *Mycobacterium tuberculosis* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 3073 *Mycobacterium leprae* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 3972 *Mycobacterium bovis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 1115 *Klebsiella pneumoniae* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 441 *Helicobacter pylori* HP1036 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 390 *Helicobacter pylori* J99 folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 7348 *Haemophilus influenzae* HI0064 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 224 *Haemophilus ducreyi* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 4349 *Escherichia coli* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 1278 *Enterococcus faecalis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 484 *Corynebacterium diphtheriae* 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)

2_7_6_3 1996 *Clostridium difficile* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 986 *Clostridium acetobutylicum* 23626540_C2_46 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3) / DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
 2_7_6_3 584 *Chlamydia trachomatis* D/UW-3/Cx folP 2-amino-4-hydroxy-6-hydroxymethyldihydropterine pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_7_6_3 1114 *Chlamydia pneumoniae* AR39 CP1114 2-amino-4-hydroxy-6-hydroxymethyldihydropterine pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_7_6_3 696 *Chlamydia pneumoniae* CWL029 folP 2-amino-4-hydroxy-6-hydroxymethyldihydropterine pyrophosphokinase (EC 2_7_6_3)/dihydropteroate synthase (EC 2_5_1_15)
 2_7_6_3 1200 *Campylobacter jejuni* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 2378 *Bordetella pertussis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 5938 *Bordetella bronchiseptica* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_3 79 *Bacillus subtilis* folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_5 7788 *Yersinia pseudotuberculosis* EC-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 4931 *Yersinia pestis* EC-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 689 *Vibrio cholerae* El Tor N16961 ORF03098 GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 498 *Streptococcus pyogenes* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1229 *Streptococcus pyogenes* BS-ywaC GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 773 *Streptococcus pneumoniae* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 244 *Streptococcus mutans* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 2042 *Streptococcus mutans* BS-ywaC GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 79 *Streptococcus equi* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 872 *Streptococcus equi* BS-relA PUTATIVE GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1447 *Staphylococcus aureus* BS-ywaC GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3595 *Staphylococcus aureus* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3758 *Staphylococcus aureus* BS-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 6012 *Salmonella typhimurium* relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 2163 *Salmonella typhi* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3523 *Salmonella paratyphi* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3524 *Salmonella paratyphi* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1096 *Salmonella enteritidis* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1140 *Salmonella dublin* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 6610 *Pseudomonas aeruginosa* relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 468 *Porphyromonas gingivalis* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1139 *Pasteurella multocida* relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1946 *Neisseria gonorrhoeae* EC-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 21 *Mycobacterium tuberculosis* Rv1366 GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1963 *Mycobacterium bovis* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3465 *Klebsiella pneumoniae* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3466 *Klebsiella pneumoniae* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 739 *Haemophilus influenzae* HI0334 GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 674 *Haemophilus ducreyi* BS-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 5657 *Escherichia coli* relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 586 *Enterococcus faecium* (DOE) GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 447 *Enterococcus faecalis* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1685 *Corynebacterium diphtheriae* GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 681 *Clostridium difficile* BS-yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1299 *Clostridium acetobutylicum* 24640635_C1_23 GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1587 *Clostridium acetobutylicum* 24354002_C1_32 GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 2778 *Bordetella pertussis* EC-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 1161 *Bacillus subtilis* yjbM GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_6_5 3841 *Bacillus subtilis* ywaC GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_7_13 2591 *Saccharomyces cerevisiae* PSA1 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 4346 *Pseudomonas aeruginosa* PA0597 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)

2_7_7_13 953 *Neisseria gonorrhoeae* BS-yfnH MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 2869 *Mycobacterium tuberculosis* rmlA2 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 2574 *Mycobacterium leprae* BS-yfnH MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 2575 *Mycobacterium leprae* MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 1071 *Mycobacterium bovis* BS-yfnH MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 1632 *Corynebacterium diphtheriae* MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 1133 *Clostridium acetobutylicum* 25682802_C2_43 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 674 *Campylobacter jejuni* Cj1416c MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 688 *Campylobacter jejuni* Cj1423c MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 1045 *Campylobacter jejuni* Cj1329 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_13 905 *Bordetella pertussis* BS-yfnH MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_14 6600 *Saccharomyces cerevisiae* MUQ1 CTP: PHOSPHOETHANOLAMINE CYTIDYLYLTRANSFERASE (EC 2_7_7_14)
 2_7_7_2 8052 *Yersinia pseudotuberculosis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 3832 *Yersinia pestis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 493 *Ureaplasma urealyticum* UU355 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 666 *Treponema pallidum* TP0888 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 681 *Streptococcus pyogenes* mreA RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1465 *Streptococcus pneumoniae* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1853 *Streptococcus mutans* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 13 *Streptococcus equi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 2663 *Staphylococcus aureus* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 5767 *Salmonella typhimurium* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 4732 *Salmonella typhi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 2866 *Salmonella paratyphi* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 4230 *Saccharomyces cerevisiae* FAD1 FAD SYNTHETASE (EC 2_7_7_2)
 2_7_7_2 4167 *Pseudomonas aeruginosa* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1607 *Porphyromonas gingivalis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 767 *Pasteurella multocida* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 334 *Neisseria gonorrhoeae* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 674 *Mycoplasma pneumoniae* MP674 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1366 *Mycoplasma genitalium* MG145 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 4232 *Mycobacterium tuberculosis* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)

2_7_7_2 2318 *Mycobacterium leprae* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 518 *Mycobacterium bovis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 6239 *Klebsiella pneumoniae* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 6240 *Klebsiella pneumoniae* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 6241 *Klebsiella pneumoniae* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 491 *Helicobacter pylori* HP1087 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 342 *Helicobacter pylori* J99 ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 19847 *Haemophilus influenzae* HI0963 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1444 *Haemophilus ducreyi* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 25 *Escherichia coli* yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE
 (EC 2_7_7_2)
 2_7_7_2 3670 *Enterococcus faecium* (DOE) EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1322 *Corynebacterium diphtheriae* RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 2033 *Clostridium difficile* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 3197 *Clostridium acetobutylicum* 2531502_F2_4 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 91 *Chlamydia trachomatis* D/UW-3/Cx EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 437 *Chlamydia pneumoniae* AR39 CP0437 RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 287 *Chlamydia pneumoniae* CWL029 EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26); / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1403 *Campylobacter jejuni* ribF RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 974 *Bordetella pertussis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 6588 *Bordetella bronchiseptica* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN
 ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_2 1667 *Bacillus subtilis* ribC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE
 (EC 2_7_7_2)
 2_7_7_2 2774 *Yersinia pestis* Q9RCC5 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) /
 MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 4122 *Vibrio cholerae* El Tor N16961 ORF00339 MANNOSE-1-PHOSPHATE
 GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 6481 *Salmonella typhimurium* spP26404 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) /
 MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 6504 *Salmonella typhimurium* spP26340 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) /
 MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 1003 *Salmonella typhi* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-
 PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 1966 *Salmonella typhi* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-
 PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 1951 *Salmonella paratyphi* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-
 PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 1953 *Salmonella paratyphi* MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC
 2_7_7_22)
 2_7_7_2 6181 *Salmonella paratyphi* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-
 PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_2 3125 *Salmonella enteritidis* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-
 PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)

2_7_7_22 1504 *Salmonella dublin* MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 3369 *Pseudomonas aeruginosa* wbpW MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 6272 *Pseudomonas aeruginosa* algA MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 8462 *Pseudomonas aeruginosa* PA2232 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 73 *Porphyromonas gingivalis* MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 80 *Porphyromonas gingivalis* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 1004 *Helicobacter pylori* HP0043 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 37 *Helicobacter pylori* J99 manC MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 5244 *Escherichia coli* cpsB MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 257 *Clostridium difficile* MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 1110 *Clostridium acetobutylicum* 7079678_C3_82 MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 1135 *Clostridium acetobutylicum* 29322135_C3_50 MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 1213 *Clostridium acetobutylicum* I9664125_C2_53 MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_22 2648 *Bacillus subtilis* yrkC MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_24 6241 *Yersinia pseudotuberculosis* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1633 *Yersinia pestis* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1392 *Streptococcus pyogenes* cpsFO GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 75 *Streptococcus mutans* sp|P95778 GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 365 *Streptococcus equi* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4177 *Salmonella typhimurium* trjQ9L6R2 GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 6491 *Salmonella typhimurium* rfbA GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 905 *Salmonella typhi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 2914 *Salmonella typhi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4249 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4891 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4892 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 3589 *Salmonella enteritidis* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1238 *Salmonella dublin* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 3294 *Salmonella dublin* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1467 *Pseudomonas aeruginosa* rmlA GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1384 *Porphyromonas gingivalis* BS-spsI GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 703 *Neisseria gonorrhoeae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 3414 *Mycobacterium tuberculosis* rmlA GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)

2_7_7_24 565 *Mycobacterium leprae* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 2904 *Mycobacterium bovis* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1017 *Klebsiella pneumoniae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4837 *Klebsiella pneumoniae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 4838 *Klebsiella pneumoniae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1528 *Haemophilus ducreyi* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 3699 *Escherichia coli* rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 5234 *Escherichia coli* rfbA GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 2912 *Enterococcus faecium* (DOE) GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 512 *Enterococcus faecalis* BS-spsI GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 394 *Corynebacterium diphtheriae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 2192 *Corynebacterium diphtheriae* GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 2507 *Clostridium acetobutylicum* 34070253_C3_16 GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 599 *Chlamydia trachomatis* D/UW-3/Cx glmU GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 1124 *Chlamydia pneumoniae* AR39 CP1124 GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 688 *Chlamydia pneumoniae* CWL029 glmU GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_24 3777 *Bacillus subtilis* spsI GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_25 4553 *Yersinia pseudotuberculosis* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5476 *Yersinia pseudotuberculosis* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 643 *Yersinia pestis* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 4150 *Yersinia pestis* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 4453 *Vibrio cholerae* El Tor N16961 ORF00816 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 6206 *Vibrio cholerae* El Tor N16961 ORF03093 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 843 *Treponema pallidum* TP0270 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1010 *Treponema pallidum* TP0596 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1225 *Streptococcus pyogenes* papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1365 *Streptococcus pyogenes* BS-ytoI TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 679 *Streptococcus pneumoniae* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 762 *Streptococcus pneumoniae* BS-ytoI TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1412 *Streptococcus mutans* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2071 *Streptococcus mutans* BS-ytoI TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 610 *Streptococcus equi* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 805 *Streptococcus equi* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2065 *Staphylococcus aureus* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)

2_7_7_25 3387 *Staphylococcus aureus* BS-ytol TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1988 *Salmonella typhimurium* pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2015 *Salmonella typhimurium* cca TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 76 *Salmonella typhi* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1219 *Salmonella typhi* POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2131 *Salmonella paratyphi* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2132 *Salmonella paratyphi* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2133 *Salmonella paratyphi* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5841 *Salmonella paratyphi* POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5842 *Salmonella paratyphi* POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 3227 *Saccharomyces cerevisiae* CCA1 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 14 *Rickettsia prowazekii* RP015 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 7601 *Pseudomonas aeruginosa* cca TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 8392 *Pseudomonas aeruginosa* pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 833 *Porphyromonas gingivalis* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 531 *Pasteurella multocida* cca TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1685 *Pasteurella multocida* pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 315 *Neisseria gonorrhoeae* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1985 *Neisseria gonorrhoeae* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1683 *Mycobacterium tuberculosis* pcnA POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1442 *Mycobacterium leprae* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1917 *Mycobacterium bovis* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5811 *Klebsiella pneumoniae* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5812 *Klebsiella pneumoniae* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 75 *Helicobacter pylori* HP0640 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 584 *Helicobacter pylori* J99trjQ9ZLJ6 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 147 *Haemophilus influenzae* HI0063 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 6893 *Haemophilus influenzae* HI1606 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 223 *Haemophilus ducreyi* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1048 *Haemophilus ducreyi*trjQ9L7A3 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2979 *Escherichia coli* cca TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 4350 *Escherichia coli* pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 444 *Enterococcus faecium* (DOE) TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 3697 *Enterococcus faecium* (DOE) TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1508 *Enterococcus faecalis* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2774 *Enterococcus faecalis* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1678 *Corynebacterium diphtheriae* POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 3218 *Clostridium difficile* BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 366 *Clostridium acetobutylicum*22844452_C2_137 TRNA NUCLEOTIDYLTRANSFERASE (EC
 2_7_7_25)
 2_7_7_25 854 *Clostridium acetobutylicum* 13680337_C2_57 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA
 NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)

2_7_7_25 2550 *Clostridium acetobutylicum* 24251587_C2_27 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 389 *Chlamydia trachomatis* D/UW-3/Cx EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 673 *Chlamydia trachomatis* D/UW-3/Cx BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 894 *Chlamydia pneumoniae* AR39 CP0894 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1024 *Chlamydia pneumoniae* AR39 CP1024 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 777 *Chlamydia pneumoniae* CWL029 BS-papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 892 *Chlamydia pneumoniae* CWL029 EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 1324 *Campylobacter jejuni* Cj0789 TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 58 *Borrelia burgdorferi* BB0706 POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2379 *Bordetella pertussis* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 3630 *Bordetella pertussis* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5912 *Bordetella bronchiseptica* TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 5999 *Bordetella bronchiseptica* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2241 *Bacillus subtilis* papS POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_25 2921 *Bacillus subtilis* ytol TRNA NUCLEOTIDYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_27 7615 *Yersinia pseudotuberculosis* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 375 *Yersinia pestis* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 5525 *Vibrio cholerae* El Tor N16961 ORF02203 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 7205 *Vibrio cholerae* El Tor N16961ORFA00388 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 1331 *Streptococcus pneumoniae* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 1421 *Streptococcus mutans* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 1221 *Streptococcus equi* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 471 *Salmonella typhimurium* glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 2113 *Salmonella typhi* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 2352 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 3398 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 4335 *Salmonella enteritidis* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 3984 *Salmonella dublin* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 4332 *Salmonella dublin* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 4615 *Salmonella dublin* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 704 *Pasteurella multocida* glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 5076 *Mycobacterium tuberculosis* glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 1123 *Mycobacterium leprae* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 2678 *Mycobacterium bovis* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 5874 *Klebsiella pneumoniae* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 6451 *Haemophilus influenzae* HI1359 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 6007 *Escherichia coli* glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 813 *Corynebacterium diphtheriae* GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)

2_7_7_27 630 *Clostridium difficile* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 2207 *Clostridium acetobutylicum* 30100157_C1_21 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 2208 *Clostridium acetobutylicum* 26571012_C2_29 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 465 *Chlamydia trachomatis* D/UW-3/Cx glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 140 *Chlamydia pneumoniae* AR39 CP0140 GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 555 *Chlamydia pneumoniae* CWL029 glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_27 3091 *Bacillus subtilis* glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_3 5181 *Yersinia pseudotuberculosis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 4845 *Yersinia pestis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 4104 *Vibrio cholerae* El Tor N16961 ORF00316 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 834 *Treponema pallidum* TP0283 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1440 *Streptococcus pyogenes* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1777 *Streptococcus pneumoniae* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1326 *Streptococcus mutans* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 129 *Streptococcus equi* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 2694 *Staphylococcus aureus* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1744 *Salmonella typhimurium* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1323 *Salmonella typhi* PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1047 *Salmonella enteritidis* PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 663 *Salmonella dublin* PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1016 *Pseudomonas aeruginosa* coaD PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 711 *Porphyromonas gingivalis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1937 *Pasteurella multocida* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1469 *Neisseria gonorrhoeae* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 811 *Mycobacterium tuberculosis* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 791 *Mycobacterium lepraespi*O69466 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 3526 *Mycobacterium bovis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 534 *Klebsiella pneumoniae* PANTETHEINE-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 4792 *Klebsiella pneumoniae* PANTETHEINE-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 856 *Helicobacter pylori* HPI475 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1355 *Helicobacter pylori* J99sp|Q9ZJE4 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 16897 *Haemophilus influenzae* HI0651 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 754 *Haemophilus ducreyi* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 3554 *Escherichia coli* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)

2_7_7_3 2085 *Enterococcus faecium* (DOE) PANTETHEINE-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 2092 *Enterococcus faecium* (DOE) PANTETHEINE-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 2521 *Enterococcus faecalis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1936 *Corynebacterium diphtheriae* PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1046 *Clostridium difficile* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 3231 *Clostridium acetobutylicum* 4141912_C2_12 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1359 *Campylobacter jejuni* kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 60 *Borrelia burgdorferi* BB0702 PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1281 *Bordetella pertussis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 6577 *Bordetella bronchiseptica* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_3 1503 *Bacillus subtilis* ylbI PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_33 222 *Yersinia pseudotuberculosis* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 2642 *Yersinia pestis* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 6488 *Salmonella typhimurium* rfbF GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 4683 *Salmonella typhi* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 4895 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 4896 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 99 *Salmonella enteritidis* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 3290 *Salmonella dublin* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_33 727 *Bacillus subtilis* yfhH GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_38 5728 *Yersinia pseudotuberculosis* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 745 *Yersinia pestis* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 5671 *Vibrio cholerae* El Tor N16961 ORF02367 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2423 *Salmonella typhimurium* kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2233 *Salmonella typhi* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2320 *Salmonella paratyphi* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2321 *Salmonella paratyphi* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2030 *Salmonella enteritidis* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2535 *Salmonella dublin* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 372 *Rickettsia prowazekii* RP379 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 4143 *Pseudomonas aeruginosa* kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 1006 *Porphyromonas gingivalis* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 1679 *Pasteurella multocida* kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 640 *Neisseria gonorrhoeae* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 3005 *Klebsiella pneumoniae* 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)

2_7_7_38 1177 *Helicobacter pylori* HP0230 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 220 *Helicobacter pylori* J99sp|Q9ZMK4 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 21757 *Haemophilus influenzae* HI0058 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 849 *Haemophilus ducreyi* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 884 *Escherichia coli* kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC
 2_7_7_38)
 2_7_7_38 174 *Chlamydia trachomatis* D/UW-3/Cx EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 527 *Chlamydia pneumoniae* AR39 CP0527 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 207 *Chlamydia pneumoniae* CWL029 EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 412 *Campylobacter jejuni* kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 2989 *Bordetella pertussis* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_38 5022 *Bordetella bronchiseptica* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE
 CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_40 853 *Streptococcus pneumoniae* BS-yacM D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_40 2442 *Staphylococcus aureus* BS-yacM D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_40 2902 *Staphylococcus aureus* D-RIBITOL-5-PHOSPHATE CYTIDYLYLTRANSFERASE (EC
 2_7_7_40)
 2_7_7_40 954 *Salmonella paratyphi* D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_40 955 *Salmonella paratyphi* D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_40 443 *Chlamydia trachomatis* D/UW-3/Cx BS-yacM D-ribitol-5-phosphate cytidyltransferase (EC
 2_7_7_40)
 2_7_7_40 169 *Chlamydia pneumoniae* AR39 CP0169 D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_40 528 *Chlamydia pneumoniae* CWL029 BS-yacM D-ribitol-5-phosphate cytidyltransferase (EC
 2_7_7_40)
 2_7_7_42 6017 *Yersinia pseudotuberculosis* EC-glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 365 *Yersinia pestis* EC-glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 6198 *Vibrio cholerae* El Tor NI6961 ORF03084 GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 1662 *Salmonella typhimurium* glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 4230 *Salmonella typhi* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 88 *Salmonella paratyphi* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 89 *Salmonella paratyphi* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 440 *Salmonella paratyphi* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 441 *Salmonella paratyphi* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 3943 *Salmonella enteritidis* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 4606 *Salmonella dublin* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 4357 *Pseudomonas aeruginosa* glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 610 *Pasteurella multocida* glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE
 (EC 2_7_7_42)
 2_7_7_42 575 *Neisseria gonorrhoeae* EC-glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)

2_7_7_42 3933 *Mycobacterium tuberculosis* glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 1696 *Mycobacterium leprae* PROBABLE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 1265 *Mycobacterium bovis* EC-glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 5799 *Klebsiella pneumoniae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 5800 *Klebsiella pneumoniae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 5801 *Klebsiella pneumoniae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 5803 *Klebsiella pneumoniae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 5804 *Klebsiella pneumoniae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 152 *Haemophilus influenzae* HI0069 GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_42 528 *Haemophilus ducreyi* EC-glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE
 (EC 2_7_7_42)
 2_7_7_42 5809 *Escherichia coli* glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC
 2_7_7_42)
 2_7_7_42 685 *Corynebacterium diphtheriae* GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE
 (EC 2_7_7_42)
 2_7_7_42 4130 *Bordetella pertussis* EC-glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE
 (EC 2_7_7_42)
 2_7_7_42 8574 *Bordetella bronchiseptica* EC-glnE GLUTAMATE-AMMONIA-LIGASE
 ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_46 626 *Klebsiella pneumoniae* 2"-AMINOGLYCOSIDE NUCLEOTIDYLTRANSFERASE (EC 2_7_7_46)
 2_7_7_47 1120 *Salmonella typhimurium* aadA STREPTOMYCIN 3"-ADENYLYLTRANSFERASE (EC
 2_7_7_47)
 2_7_7_47 5698 *Salmonella paratyphi* STREPTOMYCIN 3"-ADENYLYLTRANSFERASE (EC 2_7_7_47)
 2_7_7_47 419 *Klebsiella pneumoniae* STREPTOMYCIN 3"-ADENYLYLTRANSFERASE (EC 2_7_7_47)
 2_7_7_47 2350 *Enterococcus faecalis* streptomycin 3"-adenylyltransferase (EC 2_7_7_47) - *Escherichia coli*
 2_7_7_53 2264 *Saccharomyces cerevisiae* APA2 5',5"-P-1,4-TETRAPHOSPHATE PHOSPHORYLASE II (EC
 2_7_7_53)
 2_7_7_59 6550 *Yersinia pseudotuberculosis* EC-glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC
 2_7_7_59)
 2_7_7_59 1300 *Yersinia pestis* EC-glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 6036 *Vibrio cholerae* El Tor N16961 ORF02865 [PROTEIN-P11] URIDYLYLTRANSFERASE (EC
 2_7_7_59)
 2_7_7_59 1270 *Salmonella typhimurium* glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3765 *Salmonella typhi* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 1597 *Salmonella paratyphi* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3918 *Salmonella paratyphi* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 2669 *Salmonella enteritidis* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3051 *Salmonella dublin* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3153 *Pseudomonas aeruginosa* glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 1475 *Pasteurella multocida* glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 903 *Neisseria gonorrhoeae* EC-glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 754 *Mycobacterium tuberculosis* glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3145 *Mycobacterium leprae* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 3643 *Mycobacterium bovis* EC-glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 5932 *Klebsiella pneumoniae* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 5934 *Klebsiella pneumoniae* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 5935 *Klebsiella pneumoniae* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 14682 *Haemophilus influenzae* HI1719 [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 106 *Haemophilus ducreyi* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 107 *Haemophilus ducreyi* EC-glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 4363 *Escherichia coli* glnD [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 57 *Corynebacterium diphtheriae* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 2029 *Bordetella pertussis* [PROTEIN-P11] URIDYLYLTRANSFERASE (EC 2_7_7_59)

2_7_7_59 4128 *Bordetella pertussis* EC-glnD [PROTEIN-PII] URIDYLTRANSFERASE (EC 2_7_7_59)
 2_7_7_59 8644 *Bordetella bronchiseptica* EC-glnD [PROTEIN-PII] URIDYLTRANSFERASE (EC 2_7_7_59)
 2_7_8_1 560 *Treponema pallidum* TP0671 ETHANOLAMINEPHOSPHOTRANSFERASE (EC 2_7_8_1)
 2_7_8_1 2142 *Saccharomyces cerevisiae* EPT1 ETHANOLAMINEPHOSPHOTRANSFERASE (EC 2_7_8_1)
 2_7_8_13 7940 *Yersinia pseudotuberculosis* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1165 *Yersinia pestis* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 6171 *Vibrio cholerae* El Tor N16961 ORF03041 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 885 *Treponema pallidum* TP0345 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1518 *Streptococcus pyogenes* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 341 *Streptococcus pneumoniae* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 392 *Streptococcus mutans* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1199 *Streptococcus equi* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 2450 *Staphylococcus aureus* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 2370 *Salmonella typhimurium* murX PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 2475 *Salmonella typhi* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 3899 *Salmonella paratyphi* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 4343 *Salmonella dublin* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 574 *Rickettsia prowazekii* RP595 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 4753 *Pseudomonas aeruginosa* mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1146 *Porphyromonas gingivalis* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 583 *Pasteurella multocida* mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1597 *Neisseria gonorrhoeae* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 2414 *Mycobacterium tuberculosis* murX PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1935 *Mycobacterium leprae* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1993 *Klebsiella pneumoniae* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1994 *Klebsiella pneumoniae* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1415 *Helicobacter pylori* HP0493 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 449 *Helicobacter pylori* J99sp|Q9ZLY1 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 9667 *Haemophilus influenzae* H11135 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1418 *Haemophilus ducreyi* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 87 *Escherichia coli* mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 3460 *Enterococcus faecium* (DOE) EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1935 *Enterococcus faecalis* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)

2_7_8_13 591 *Corynebacterium diphtheriae* PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1162 *Clostridium difficile* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1790 *Clostridium acetobutylicum* 20589677_C2_46 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 726 *Chlamydia trachomatis* D/UW-3/Cx EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 966 *Chlamydia pneumoniae* AR39 CP0966 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 832 *Chlamydia pneumoniae* CWL029 EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 212 *Campylobacter jejuni* mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 438 *Borrelia burgdorferi* BB0303 PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1255 *Bordetella pertussis* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 7510 *Bordetella bronchiseptica* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_13 1520 *Bacillus subtilis* mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_20 1794 *Salmonella typhimurium* mdoB PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 1556 *Salmonella typhi* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 2749 *Salmonella paratyphi* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 2750 *Salmonella paratyphi* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 2815 *Salmonella enteritidis* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 2167 *Salmonella dublin* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 222 *Pseudomonas aeruginosa* PA1115 PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 7519 *Klebsiella pneumoniae* PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_20 6461 *Escherichia coli* mdoB PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_23 4666 *Salmonella dublin* PUTATIVE CARBOXYVINYL-CARBOXYPHOSPHONATE PHOSPHORYLMUTASE (EC 2_7_8_23)
 2_7_8_23 5661 *Bordetella bronchiseptica* CARBOXYVINYL-CARBOXYPHOSPHONATE PHOSPHORYLMUTASE (EC 2_7_8_23)
 2_7_8_5 5889 *Yersinia pseudotuberculosis* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1063 *Yersinia pestis* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 4608 *Yersinia pestis* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5040 *Vibrio cholerae* El Tor N16961 ORF01576 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5466 *Vibrio cholerae* El Tor N16961 ORF02132 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5731 *Vibrio cholerae* El Tor N16961 ORF02442 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 504 *Ureaplasma urealyticum* UU364 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 855 *Treponema pallidum* TP0256 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1061 *Streptococcus pyogenes* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1743 *Streptococcus pneumoniae* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1088 *Streptococcus mutans* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1493 *Streptococcus equi* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 4619 *Salmonella typhimurium* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)

2_7_8_5 5108 *Salmonella typhi* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 3968 *Salmonella paratyphi* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 3969 *Salmonella paratyphi* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2285 *Saccharomyces cerevisiae* YKR070W CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 6680 *Saccharomyces cerevisiae* PGS1 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 48 *Rickettsia prowazekii* RP049 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2929 *Pseudomonas aeruginosa* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 6516 *Pseudomonas aeruginosa* PA2541 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 56 *Pasteurella multocida* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1677 *Pasteurella multocida* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1025 *Neisseria gonorrhoeae* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 580 *Mycoplasma pneumoniae* MP580 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2321 *Mycoplasma genitalium* MG114 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 271 *Mycobacterium tuberculosis* pgsA2 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5267 *Mycobacterium tuberculosis* pgsA3 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1831 *Mycobacterium leprae* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2929 *Mycobacterium lepraetrj* O32921 PUTATIVE CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYL-TRANSFERASE (EC 2_7_8_5)
 2_7_8_5 335 *Mycobacterium bovis* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1987 *Mycobacterium bovis* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 4469 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 4470 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 422 *Helicobacter pylori* HP1016 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 409 *Helicobacter pylori* J99 pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 292 *Haemophilus influenzae* HI0123 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 438 *Haemophilus ducreyi* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1368 *Escherichia coli* b1408 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5082 *Escherichia coli* b1758 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 5174 *Escherichia coli* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 984 *Enterococcus faecium* (DOE) PUTATIVE CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYL-TRANSFERASE (EC 2_7_8_5)
 2_7_8_5 3738 *Enterococcus faecium* (DOE) EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2034 *Enterococcus faecalis* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)

2_7_8_5 1116 *Corynebacterium diphtheriae* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2003 *Corynebacterium diphtheriae* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2442 *Clostridium difficile* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 3563 *Clostridium acetobutylicum* 4150093_C2_10 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 763 *Chlamydia trachomatis* D/UW-3/Cx EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 979 *Chlamydia trachomatis* D/UW-3/Cx CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 132 *Chlamydia pneumoniae* AR39 CP0132 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 912 *Chlamydia pneumoniae* AR39 CP0912 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 562 *Chlamydia pneumoniae* CWL029 pgsA_1 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 875 *Chlamydia pneumoniae* CWL029 pgsA_2 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 2879 *Campylobacter jejuni* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 868 *Borrelia burgdorferi* BB0721 CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 3728 *Bordetella pertussis* EC-pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_5 1692 *Bacillus subtilis* pgsA CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_6 4143 *Vibrio cholerae* El Tor N16961 ORF00365 UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 103 *Streptococcus pneumoniae* BS-yvfC UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 6479 *Salmonella typhimurium* rfbP UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1012 *Salmonella typhi* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 5133 *Salmonella typhi* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1945 *Salmonella paratyphi* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1946 *Salmonella paratyphi* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 6183 *Salmonella paratyphi* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 2638 *Salmonella enteritidis* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 2718 *Salmonella dublin* UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 263 *Pasteurella multocida* rfbP UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1387 *Neisseria gonorrhoeae* BS-yvfC UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 662 *Mycobacterium tuberculosis* Rv1505c UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 916 *Mycobacterium bovis* BS-yvfD UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 9140 *Haemophilus influenzae* HI0872 UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 5242 *Escherichia coli* b2047 UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 2328 *Enterococcus faecium* (DOE) UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)

2_7_8_6 3878 *Enterococcus faecium* (DOE) UNDECAPRENYL-PHOSPHATE
 GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1136 *Clostridium acetobutylicum* 22557967_C2_42 UNDECAPRENYL-PHOSPHATE
 GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1214 *Clostridium acetobutylicum* 36620175_C3_60 UNDECAPRENYL-PHOSPHATE
 GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_6 1588 *Campylobacter jejuni* wlaI UNDECAPRENYL-PHOSPHATE
 GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6) FRAMESHIFT
 2_7_8_6 3420 *Bacillus subtilis* yvfC UNDECAPRENYL-PHOSPHATE
 GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_7 1716 *Yersinia pestis* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 6214 *Vibrio cholerae* El Tor N16961 ORF03106 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 612 *Treponema pallidum* TP0828 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 806 *Streptococcus pyogenes* acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 967 *Streptococcus pneumoniae* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 1256 *Streptococcus mutans* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 1929 *Streptococcus equi* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 5782 *Salmonella typhimurium* dpj HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 4722 *Salmonella paratyphi* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 1460 *Salmonella enteritidis* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 4080 *Salmonella dublin* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 559 *Rickettsia prowazekii* RP577 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 1369 *Neisseria gonorrhoeae* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 539 *Mycoplasma pneumoniae* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 390 *Mycoplasma genitalium* MG211_1 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 3197 *Mycobacterium tuberculosis* acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 1598 *Mycobacterium leprae* sp|Q9X7E3 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 3302 *Mycobacterium bovis* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 4576 *Klebsiella pneumoniae* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 231 *Helicobacter pylori* HP0808 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 743 *Helicobacter pylori* J99sp|Q9ZL36 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 5549 *Escherichia coli* acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 86 *Enterococcus faecalis* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 3 *Corynebacterium diphtheriae* HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 1909 *Clostridium difficile* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 230 *Clostridium acetobutylicum* 10728752_C1_93 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE
 (EC 2_7_8_7)
 2_7_8_7 98 *Chlamydia trachomatis* D/UW-3/Cx acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 445 *Chlamydia pneumoniae* AR39 CP0445 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 279 *Chlamydia pneumoniae* CWL029 acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 662 *Campylobacter jejuni* acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 745 *Borrelia burgdorferi* BB0010 HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 3725 *Bordetella pertussis* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_7 5792 *Bordetella bronchiseptica* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC
 2_7_8_7)
 2_7_8_7 462 *Bacillus subtilis* ydcB HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_8 5969 *Yersinia pseudotuberculosis* EC-pssA CDP-DIACYLGLYCEROL--SERINE O-
 PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 4500 *Yersinia pestis* EC-pssA CDP-DIACYLGLYCEROL--SERINE O-
 PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 4190 *Vibrio cholerae* El Tor N16961 ORF00445 CDP-DIACYLGLYCEROL--SERINE O-
 PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 5075 *Salmonella typhimurium* pss CDP-DIACYLGLYCEROL--SERINE O-
 PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)

2_7_8_8 1275 *Salmonella typhi* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 3029 *Salmonella paratyphi* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 3030 *Salmonella paratyphi* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1496 *Salmonella enteritidis* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 3247 *Salmonella dublin* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 6716 *Saccharomyces cerevisiae* CHO1 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 236 *Rickettsia prowazekii* RP242 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 3442 *Pseudomonas aeruginosa* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 5981 *Pseudomonas aeruginosa* PA3857 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1613 *Porphyromonas gingivalis* BS-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1130 *Pasteurella multocida* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 781 *Neisseria gonorrhoeae* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 4980 *Mycobacterium tuberculosis* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1813 *Mycobacterium leprae* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1858 *Mycobacterium bovis* BS-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 850 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 851 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1601 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 475 *Helicobacter pylori* HP1071 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 358 *Helicobacter pylori* J99 pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 911 *Haemophilus influenzae* HI0425 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1442 *Haemophilus ducreyi* EC-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 2525 *Escherichia coli* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 2230 *Clostridium acetobutylicum* 16839050_CI_18 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 2595 *Clostridium acetobutylicum* 6561_F2_1 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 790 *Chlamydia trachomatis* D/UW-3/Cx BS-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 873 *Chlamydia pneumoniae* AR39 CP0873 CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 909 *Chlamydia pneumoniae* CWL029 BS-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 1604 *Campylobacter jejuni* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 3075 *Bordetella pertussis* BS-pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_8_8 8805 *Bordetella bronchiseptica* CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)

2_7_8_8 228 *Bacillus subtilis* pssA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLTRANSFERASE (EC 2_7_8_8)
 2_7_9_1 494 *Treponema pallidum* TP0746 PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 370 *Streptococcus pyogenes* PYRUVATE,PHOSPHATE DIKINASE PRECURSOR (EC 2_7_9_1)
 2_7_9_1 478 *Rickettsia prowazekii* RP492 PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 187 *Porphyromonas gingivalis* PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 331 *Porphyromonas gingivalis* PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 2265 *Mycobacterium tuberculosis* ppdK PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 2657 *Mycobacterium lepraetrj*O05566 PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 959 *Mycobacterium bovis* PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 2648 *Enterococcus faecalis* PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_1 3100 *Clostridium difficile* PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_2 7957 *Yersinia pseudotuberculosis* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2167 *Yersinia pestis* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 7487 *Vibrio cholerae* El Tor N16961ORFA00741 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1410 *Streptococcus pneumoniae* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 7004 *Salmonella typhimurium* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1616 *Salmonella typhi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2327 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2328 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2330 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2331 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 5491 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 690 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1665 *Salmonella dublin* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 3814 *Pseudomonas aeruginosa* ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 464 *Neisseria gonorrhoeae* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 3697 *Mycobacterium tuberculosis* Rv2047c PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2525 *Mycobacterium lepraetrj*O32934 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2960 *Mycobacterium leprae* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 3432 *Mycobacterium bovis* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 6181 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 6418 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 6419 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1078 *Helicobacter pylori* HP0121 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 115 *Helicobacter pylori* J99sp|Q9ZMV4 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 5049 *Escherichia coli* ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 278 *Clostridium difficile* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 946 *Clostridium acetobutylicum* 3931625_C1_31 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2227 *Clostridium acetobutylicum* 12968767_C3_24 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2228 *Clostridium acetobutylicum* 24417508_C2_20 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 2231 *Clostridium acetobutylicum* 5122015_C3_22 PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 677 *Campylobacter jejuni* Cj1418c PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1489 *Bordetella pertussis* PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 4168 *Bordetella pertussis* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 7662 *Bordetella bronchiseptica* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 1881 *Bacillus subtilis* pps PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_7_9_2 3514 *Bacillus subtilis* yvKc PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_8_1_6 7843 *Yersinia pseudotuberculosis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3238 *Yersinia pestis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 5402 *Yersinia pestis* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 4938 *Vibrio cholerae* El Tor N16961 ORF01454 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1383 *Staphylococcus aureus* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1582 *Salmonella typhimurium* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1584 *Salmonella typhimurium* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3589 *Salmonella typhi* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 150 *Salmonella paratyphi* BIOTIN SYNTHASE (EC 2_8_1_6)

2_8_1_6 5052 *Salmonella enteritidis* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1038 *Salmonella dublin* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 8006 *Saccharomyces cerevisiae* BIO2 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3612 *Pseudomonas aeruginosa* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 603 *Porphyromonas gingivalis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1394 *Pasteurella multocida* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 630 *Neisseria gonorrhoeae* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3171 *Mycobacterium tuberculosis* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3089 *Mycobacterium leprae* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3189 *Mycobacterium bovis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1927 *Klebsiella pneumoniae* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 793 *Helicobacter pylori* HP1406 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1287 *Helicobacter pylori* J99sp|Q9ZJK8 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 2168 *Haemophilus influenzae* HI1022 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1117 *Haemophilus ducreyi* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 742 *Escherichia coli* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1508 *Corynebacterium diphtheriae* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 1920 *Corynebacterium diphtheriae* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 302 *Clostridium difficile* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 303 *Clostridium difficile* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3307 *Clostridium difficile* BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 739 *Clostridium acetobutylicum* 33281550_F2_24 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 808 *Chlamydia pneumoniae* AR39 CP0808 BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 966 *Chlamydia pneumoniae* CWL029 bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 506 *Campylobacter jejuni* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 2402 *Bordetella pertussis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 5454 *Bordetella bronchiseptica* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_1_6 3014 *Bacillus subtilis* bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_2_22 2571 *Salmonella typhimurium* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 2573 *Salmonella typhimurium* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 3010 *Salmonella typhi* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 701 *Salmonella paratyphi* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 702 *Salmonella paratyphi* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 703 *Salmonella paratyphi* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 1732 *Salmonella enteritidis* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_2_22 3020 *Salmonella dublin* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_3_1 1651 *Escherichia coli* ydiF propionate CoA-transferase (EC 2_8_3_1)
 2_8_3_12 4714 *Pseudomonas aeruginosa* PA0227 GLUTACONATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_12)
 2_8_3_12 6208 *Pseudomonas aeruginosa* PA0226 GLUTACONATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_12)
 2_8_3_12 2815 *Mycobacterium tuberculosis* Rv3551 GLUTACONATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_12)
 2_8_3_12 2822 *Mycobacterium tuberculosis* Rv3552 GLUTACONATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_12)
 2_8_3_12 536 *Mycobacterium bovis* GLUTACONATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_12)
 2_8_3_12 537 *Mycobacterium bovis* GLUTACONATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_12)
 2_8_3_3 7781 *Pseudomonas aeruginosa* mdcA malonate CoA-transferase (EC 2_8_3_3) / malonyl-CoA decarboxylase (EC 4_1_1_9)
 2_8_3_6 5462 *Pseudomonas aeruginosa* PA2000 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 4595 *Mycobacterium tuberculosis* scoB 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 1984 *Mycobacterium leprae* EC-atoA 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 2795 *Mycobacterium bovis* BS-yxjE 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 1368 *Klebsiella pneumoniae* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 6863 *Klebsiella pneumoniae* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 850 *Bordetella pertussis* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_6)
 2_8_3_6 2931 *Bordetella pertussis* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 2979 *Bordetella pertussis* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_6)

2_8_3_6 4252 *Bordetella pertussis* BS-yxjE 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 7472 *Bordetella bronchiseptica* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_6)
 2_8_3_6 8413 *Bordetella bronchiseptica* EC-atoA 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 8419 *Bordetella bronchiseptica* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT A (EC 2_8_3_6)
 2_8_3_6 8420 *Bordetella bronchiseptica* 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_6 3891 *Bacillus subtilis* yxjE 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_8 1502 *Bordetella pertussis* butyryl-CoA:acetate coenzyme A transferase (EC 2_8_3_8)
 2_8_3_8 1970 *Bacillus subtilis* yodS ACETATE COA-TRANSFERASE ALPHA SUBUNIT (EC 2_8_3_8)
 2_8_3_9 1522 *Porphyromonas gingivalis* EC-atoA BUTYRATE-ACETOACETATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_9)
 2_8_3_9 1499 *Clostridium difficile* BUTYRATE-ACETOACETATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_9)
 2_8_3_9 673 *Clostridium acetobutylicum* 22677217_F2_17 BUTYRATE-ACETOACETATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_9)
 2_8_3_9 1969 *Bacillus subtilis* yodR BUTYRATE-ACETOACETATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_9)
 2_9_1_1 7835 *Yersinia pseudotuberculosis* EC-selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 890 *Yersinia pestis* EC-selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 4804 *Salmonella typhimurium* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 5966 *Salmonella typhimurium* selA L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 6782 *Salmonella typhimurium* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 901 *Salmonella typhi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3428 *Salmonella typhi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 4606 *Salmonella typhi* L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 878 *Salmonella paratyphi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 879 *Salmonella paratyphi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 880 *Salmonella paratyphi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 2377 *Salmonella paratyphi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 6311 *Salmonella paratyphi* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 974 *Salmonella enteritidis* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1982 *Salmonella enteritidis* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3816 *Salmonella enteritidis* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1839 *Salmonella dublin* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3010 *Salmonella dublin* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3629 *Salmonella dublin* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 7363 *Pseudomonas aeruginosa* selA L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 786 *Pasteurella multocida* selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1280 *Klebsiella pneumoniae* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1281 *Klebsiella pneumoniae* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1282 *Klebsiella pneumoniae* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1283 *Klebsiella pneumoniae* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 5069 *Klebsiella pneumoniae* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 893 *Helicobacter pylori* HP1513 L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1393 *Helicobacter pylori* J99trjQ9ZJA7 L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 5177 *Haemophilus influenzae* HI0708 L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 1196 *Haemophilus ducreyi* EC-selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 5971 *Escherichia coli* yhfS L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 6529 *Escherichia coli* selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3030 *Enterococcus faecium* (DOE) L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 333 *Enterococcus faecalis* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 2374 *Enterococcus faecalis* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 2941 *Clostridium difficile* L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 3357 *Clostridium difficile* EC-selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
 2_9_1_1 617 *Campylobacter jejuni* selA L-SERYL-TRNA(SER) SELENIUM TRANSFERASE (EC 2_9_1_1)
 3_1_1_10 5017 *Yersinia pestis* TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 4835 *Salmonella typhi* TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 4155 *Salmonella paratyphi* TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 1391 *Pasteurella multocida* TROPINESTERASE (EC 3_1_1_10)

3_1_1_10 1540 Mycobacterium tuberculosis lipV TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 2279 Mycobacterium tuberculosis bpoB TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 2790 Mycobacterium tuberculosis Rv3591c TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 3214 Mycobacterium leprae TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 963 Mycobacterium bovis TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 2153 Mycobacterium bovis TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 3348 Mycobacterium bovis TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 14256 Haemophilus influenzae HI0193 TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 609 Haemophilus ducreyi TROPINESTERASE (EC 3_1_1_10)
 3_1_1_10 4592 Escherichia coli b0686 TROPINESTERASE (EC 3_1_1_10)
 3_1_1_11 4009 Yersinia pestis PECTINESTERASE A PRECURSOR (EC 3_1_1_11)
 3_1_1_11 2658 Salmonella typhimurium ybhC PECTINESTERASE B PRECURSOR (EC 3_1_1_11)
 3_1_1_11 1527 Salmonella typhi PECTINESTERASE B PRECURSOR (EC 3_1_1_11)
 3_1_1_11 673 Salmonella paratyphi PECTINESTERASE B PRECURSOR (EC 3_1_1_11)
 3_1_1_11 196 Salmonella enteritidis PECTINESTERASE B PRECURSOR (EC 3_1_1_11)
 3_1_1_11 4621 Escherichia coli ybhC PECTINESTERASE B PRECURSOR (EC 3_1_1_11)
 3_1_1_11 3188 Enterococcus faecium (DOE) PECTINESTERASE (EC 3_1_1_11)
 3_1_1_11 213 Clostridium acetobutylicum 25660963_C3_124 PECTINESTERASE (EC 3_1_1_11)
 3_1_1_17 3906 Salmonella typhimurium GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_17 1602 Salmonella paratyphi GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_17 740 Salmonella enteritidis GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_17 3504 Salmonella dublin GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_17 892 Pasteurella multocida GLUCONOLACTONASE PRECURSOR (EC 3_1_1_17)
 3_1_1_17 7341 Klebsiella pneumoniae GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_17 7933 Klebsiella pneumoniae GLUCONOLACTONASE PRECURSOR (EC 3_1_1_17)
 3_1_1_17 8445 Klebsiella pneumoniae GLUCONOLACTONASE (EC 3_1_1_17)
 3_1_1_20 3532 Klebsiella pneumoniae TANNASE PRECURSOR (EC 3_1_1_20)
 3_1_1_20 3533 Klebsiella pneumoniae TANNASE PRECURSOR (EC 3_1_1_20)
 3_1_1_24 533 Streptococcus mutans 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 1082 Staphylococcus aureus 3-OXOADIPATE ENOL-LACTONASE I (EC 3_1_1_24)
 3_1_1_24 3641 Staphylococcus aureus 3-OXOADIPATE ENOL-LACTONASE I (EC 3_1_1_24)
 3_1_1_24 2129 Pseudomonas aeruginosa pcaD 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 5732 Pseudomonas aeruginosa PA0480 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 7719 Pseudomonas aeruginosa PA3226 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 1237 Mycobacterium leprae 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 5196 Klebsiella pneumoniae 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 2209 Bordetella pertussis 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 2934 Bordetella pertussis BS-yisY 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 8423 Bordetella bronchiseptica BS-yisY 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_24 9626 Bordetella bronchiseptica 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
 3_1_1_41 319 Bacillus subtilis cah CEPHALOSPORIN-C DEACETYLASE (EC 3_1_1_41)
 3_1_1_45 5384 Yersinia pseudotuberculosis PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 1749 Yersinia pestis PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 5826 Salmonella typhimurium ysgA PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 2272 Salmonella enteritidis PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 2769 Salmonella dublin PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 7745 Saccharomyces cerevisiae YDL086W PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 1413 Pseudomonas aeruginosa PA2682 CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 6588 Escherichia coli b3830 PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 4134 Bordetella pertussis PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 5085 Bordetella bronchiseptica CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_45 8354 Bordetella bronchiseptica PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
 3_1_1_57 1506 Yersinia pestis Q9ZC43 2-PYRONE-4,6-DICARBOXYLATE LACTONASE (EC 3_1_1_57)
 3_1_1_57 1445 Campylobacter jejuni Cj0556 2-PYRONE-4,6-DICARBOXYLATE LACTONASE (EC 3_1_1_57)
 3_1_1_57 2168 Bordetella pertussis 2-PYRONE-4,6-DICARBOXYLATE LACTONASE (EC 3_1_1_57)
 3_1_1_57 6020 Bordetella bronchiseptica 2-PYRONE-4,6-DICARBOXYLATE LACTONASE (EC 3_1_1_57)
 3_1_1_61 4947 Yersinia pseudotuberculosis EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)

3_1_1_61 2901 *Yersinia pestis* EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 5226 *Vibrio cholerae* El Tor N16961 ORF01801 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 5856 *Vibrio cholerae* El Tor N16961 ORF02604 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 7693 *Vibrio cholerae* El Tor N16961 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 594 *Treponema pallidum* TP0631 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 239 *Salmonella typhimurium* hnr PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 4726 *Salmonella typhimurium* cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 743 *Salmonella typhi* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 1244 *Salmonella paratyphi* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 1245 *Salmonella paratyphi* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 6245 *Salmonella paratyphi* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 3453 *Salmonella enteritidis* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 3255 *Salmonella dublin* PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 704 *Pseudomonas aeruginosa* PA0414 PILI CHEMOTAXIS PROTEIN METHYL ESTERASE CHEB HOMOLOG (EC 3_1_1_61)
 3_1_1_61 5224 *Pseudomonas aeruginosa* PA1459 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 5753 *Pseudomonas aeruginosa* PA0173 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 6784 *Pseudomonas aeruginosa* PA3703 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 5154 *Escherichia coli* cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 2167 *Clostridium difficile* EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 2695 *Clostridium acetobutylicum* 5986510_C2_24 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 2821 *Clostridium acetobutylicum* 26173437_F2_4 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 1908 *Campylobacter jejuni* cheB' PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 188 *Borrelia burgdorferi* BB0568 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 335 *Borrelia burgdorferi* BB0415 PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 3355 *Bordetella pertussis* EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 5693 *Bordetella bronchiseptica* EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_61 1642 *Bacillus subtilis* cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
 3_1_1_72 970 *Streptococcus pneumoniae* acetylxyloxyesterase (EC 3_1_1_72)
 3_1_1_72 1170 *Streptococcus equi* acetylxyloxyesterase (EC 3_1_1_72)
 3_1_1_72 1162 *Enterococcus faecalis* acetylxyloxyesterase (EC 3_1_1_72)
 3_1_1_72 2119 *Enterococcus faecalis* acetylxyloxyesterase (EC 3_1_1_72)
 3_1_11_1 6283 *Yersinia pseudotuberculosis* EC-sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 3299 *Yersinia pestis* EC-sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 5059 *Vibrio cholerae* El Tor N16961 ORF01598 EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 4226 *Salmonella typhimurium* sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 5131 *Salmonella typhi* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 5536 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 7389 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 1843 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 2632 *Salmonella dublin* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 1817 *Pseudomonas aeruginosa* sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 1568 *Pasteurella multocida* sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 7776 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 7777 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 7778 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 2905 *Haemophilus influenzae* HI1377 EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 1001 *Haemophilus ducreyi* EC-sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_1 1959 *Escherichia coli* sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_11_1)
 3_1_11_3 1657 *Salmonella typhi* EXONUCLEASE (EC 3_1_11_3)
 3_1_11_3 4514 *Escherichia coli* b0539 EXONUCLEASE (EC 3_1_11_3)
 3_1_11_3 373 *Bordetella pertussis* EXONUCLEASE (EC 3_1_11_3)
 3_1_11_3 9236 *Bordetella bronchiseptica* EXONUCLEASE (EC 3_1_11_3)
 3_1_11_5 4547 *Yersinia pseudotuberculosis* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)

3_1_11_5 4897 *Yersinia pseudotuberculosis* EC-recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 7136 *Yersinia pseudotuberculosis* EC-recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 7600 *Yersinia pseudotuberculosis* EC-recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 1068 *Yersinia pestis* EC-recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 1570 *Yersinia pestis* EC-recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1572 *Yersinia pestis* EC-recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 6087 *Vibrio cholerae* El Tor N16961 ORF02938 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 6088 *Vibrio cholerae* El Tor N16961 ORF02941 EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 6090 *Vibrio cholerae* El Tor N16961 ORF02943 EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 697 *Streptococcus pyogenes* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 27 *Streptococcus pneumoniae* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1132 *Streptococcus mutans* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 456 *Streptococcus equi* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1772 *Staphylococcus aureus* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1308 *Salmonella typhimurium* rorA EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 4986 *Salmonella typhimurium* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 4991 *Salmonella typhimurium* recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 5556 *Salmonella typhimurium* recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2707 *Salmonella typhi* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3279 *Salmonella typhi* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 3280 *Salmonella typhi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 58 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1087 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1088 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1089 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1090 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1091 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1092 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1093 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3676 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3677 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3678 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3679 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3145 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3655 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 5148 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 1035 *Salmonella dublin* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2781 *Salmonella dublin* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3510 *Salmonella dublin* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3325 *Pseudomonas aeruginosa* recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3322 *Pseudomonas aeruginosa* recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 8231 *Pseudomonas aeruginosa* recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1328 *Porphyromonas gingivalis* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1523 *Pasteurella multocida* recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1524 *Pasteurella multocida* recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1754 *Pasteurella multocida* recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 20215 *Neurospora crassa* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 125 *Neisseria gonorrhoeae* EC-recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 367 *Neisseria gonorrhoeae* EC-pspE EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)

3_1_11_5 1001 *Neisseria gonorrhoeae* EC-recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1992 *Neisseria gonorrhoeae* EC-recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 2061 *Mycobacterium tuberculosis* recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 5281 *Mycobacterium tuberculosis* recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 5282 *Mycobacterium tuberculosis* recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 1067 *Mycobacterium bovis* EC-recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1407 *Mycobacterium bovis* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1409 *Mycobacterium bovis* EC-recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 3384 *Mycobacterium bovis* EC-recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 895 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 2184 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 2186 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 2187 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 2692 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 2693 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 3907 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3908 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3910 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3911 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3912 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 3913 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 3914 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 3915 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 3916 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 5602 *Haemophilus influenzae* H10942 EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 6395 *Haemophilus influenzae* H11322 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 10055 *Haemophilus influenzae* H11321 EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 240 *Haemophilus ducreyi* EC-recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 1061 *Haemophilus ducreyi* EC-recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 1372 *Haemophilus ducreyi* EC-recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 5675 *Escherichia coli* recD EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 5676 *Escherichia coli* recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 5678 *Escherichia coli* recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 1562 *Enterococcus faecium* (DOE) EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2314 *Enterococcus faecalis* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2119 *Clostridium difficile* BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2719 *Clostridium acetobutylicum* 19961068_F3_4 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 32 *Chlamydia trachomatis* D/UW-3/Cx BS-ymrC EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 610 *Chlamydia trachomatis* D/UW-3/Cx recB EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 611 *Chlamydia trachomatis* D/UW-3/Cx recC EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 623 *Chlamydia trachomatis* D/UW-3/Cx recD_2 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 7 *Chlamydia pneumoniae* AR39 CP0007 EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 8 *Chlamydia pneumoniae* AR39 CP0008 EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 650 *Chlamydia pneumoniae* AR39 CP0650 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)

3_1_11_5 1120 *Chlamydia pneumoniae* AR39 CP1120 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 111 *Chlamydia pneumoniae* CWL029 BS-*ymc* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 678 *Chlamydia pneumoniae* CWL029 *recC* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 679 *Chlamydia pneumoniae* CWL029 *recB* EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 691 *Chlamydia pneumoniae* CWL029 *recD_2* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 125 *Borrelia burgdorferi* BB0634 EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_11_5)
 3_1_11_5 127 *Borrelia burgdorferi* BB0633 EXODEOXYRIBONUCLEASE V BETA CHAIN (EC 3_1_11_5)
 3_1_11_5 128 *Borrelia burgdorferi* BB0632 EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_5 2740 *Bacillus subtilis* *ymc* EXODEOXYRIBONUCLEASE V ALPHA CHAIN (EC 3_1_11_5)
 3_1_11_6 4498 *Yersinia pseudotuberculosis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 7443 *Yersinia pseudotuberculosis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 995 *Yersinia pestis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4519 *Yersinia pestis* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4788 *Yersinia pestis* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4621 *Vibrio cholerae* El Tor N16961 ORF01026 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4737 *Vibrio cholerae* El Tor N16961 ORF01183 EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 544 *Streptococcus pyogenes* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 545 *Streptococcus pyogenes* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 48 *Streptococcus pneumoniae* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 49 *Streptococcus pneumoniae* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1448 *Streptococcus mutans* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1449 *Streptococcus mutans* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1045 *Streptococcus equi* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1051 *Streptococcus equi* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1905 *Staphylococcus aureus* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3365 *Staphylococcus aureus* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1978 *Salmonella typhimurium* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 5130 *Salmonella typhimurium* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3297 *Salmonella typhi* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3879 *Salmonella typhi* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 654 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 5036 *Salmonella paratyphi* EXODEOXYRIBONUCLEASE SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2123 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3984 *Salmonella enteritidis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4382 *Salmonella dublin* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 344 *Rickettsia prowazekii* RP350 EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 649 *Rickettsia prowazekii* RP675 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 5449 *Pseudomonas aeruginosa* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 6665 *Pseudomonas aeruginosa* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1475 *Porphyromonas gingivalis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)

3_1_11_6 83 *Pasteurella multocida* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 713 *Pasteurella multocida* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1346 *Neisseria gonorrhoeae* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1536 *Neisseria gonorrhoeae* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4273 *Mycobacterium tuberculosis* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4274 *Mycobacterium tuberculosis* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2824 *Mycobacterium leprae*tr|Q9X784 EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2825 *Mycobacterium leprae*tr|Q9X783 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 978 *Mycobacterium bovis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 979 *Mycobacterium bovis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1068 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4430 *Klebsiella pneumoniae* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1206 *Helicobacter pylori* HP0259 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 248 *Helicobacter pylori* J99tr|Q9ZMH7 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 855 *Haemophilus influenzae* HI0397 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3019 *Haemophilus influenzae* HI1437 EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 103 *Haemophilus ducreyi* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 104 *Haemophilus ducreyi* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2449 *Escherichia coli* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4464 *Escherichia coli* xseB EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1516 *Enterococcus faecium* (DOE) EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 1525 *Enterococcus faecium* (DOE) EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2960 *Enterococcus faecalis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2961 *Enterococcus faecalis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 793 *Corynebacterium diphtheriae* EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2547 *Corynebacterium diphtheriae* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3048 *Clostridium difficile* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3049 *Clostridium difficile* EXODEOXYRIBONUCLEASE SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3468 *Clostridium acetobutylicum* 20735887_F3_4 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 3469 *Clostridium acetobutylicum*.9869050_F3_5 EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 314 *Chlamydia trachomatis* D/UW-3/Cx EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 315 *Chlamydia trachomatis* D/UW-3/Cx EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 787 *Chlamydia pneumoniae* AR39 CP0787 EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 788 *Chlamydia pneumoniae* AR39 CP0788 EXODEOXYRIBONUCLEASE SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 983 *Chlamydia pneumoniae* CWL029 EXODEOXYRIBONUCLEASE SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 984 *Chlamydia pneumoniae* CWL029 EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2290 *Campylobacter jejuni* xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)

3_1_11_6 1932 *Bordetella pertussis* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 4097 *Bordetella pertussis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 6243 *Bordetella bronchiseptica* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_11_6 6810 *Bordetella bronchiseptica* EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2424 *Bacillus subtilis* yqiC EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT (EC 3_1_11_6)
 3_1_11_6 2425 *Bacillus subtilis* yqiB EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_11_6)
 3_1_13_4 1035 *Saccharomyces cerevisiae* PAN3 PAB-DEPENDENT POLY(A)-SPECIFIC RIBONUCLEASE SUBUNIT PAN3 (EC 3_1_13_4)
 3_1_13_4 3663 *Saccharomyces cerevisiae* PAN2 PAB-DEPENDENT POLY(A)-SPECIFIC RIBONUCLEASE SUBUNIT PAN2 (EC 3_1_13_4)
 3_1_2_14 431 *Streptococcus pyogenes* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_2_14 554 *Streptococcus pneumoniae* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_2_14 1277 *Streptococcus mutans* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_2_14 757 *Streptococcus equi* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_2_14 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3- HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 3_1_2_14 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2213 *Enterococcus faecalis* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_2_14 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 3_1_2_14 2421 *Clostridium acetobutylicum* 4465_F3_6 OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
 3_1_21_2 4558 *Yersinia pseudotuberculosis* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 4286 *Yersinia pestis* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 6127 *Vibrio cholerae* El Tor N16961 ORF02989 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 442 *Ureaplasma urealyticum* UU306 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2640 *Staphylococcus aureus* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2050 *Salmonella typhimurium* nfo ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 593 *Salmonella typhi* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2465 *Salmonella paratyphi* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 631 *Salmonella dublin* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 5087 *Pseudomonas aeruginosa* PA0238 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 509 *Mycoplasma pneumoniae* MP509 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2543 *Mycoplasma genitalium* MG235 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 337 *Mycobacterium tuberculosis* Rv0498 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 4777 *Mycobacterium tuberculosis* end ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 1413 *Mycobacterium leprae* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 3018 *Mycobacterium leprae* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 1840 *Mycobacterium bovis* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 3243 *Mycobacterium bovis* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 925 *Klebsiella pneumoniae* ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 1073 *Haemophilus ducreyi* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2108 *Escherichia coli* nfo ENDONUCLEASE IV (EC 3_1_21_2)

3_1_21_2 683 *Enterococcus faecium* (DOE) BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 3530 *Clostridium difficile* BS-yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2434 *Clostridium acetobutylicum* 204837_C1_21 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2767 *Clostridium acetobutylicum* 10634382_F2_8 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 595 *Chlamydia trachomatis* D/UW-3/Cx nfo ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 14 *Chlamydia pneumoniae* AR39 CP0014 ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 673 *Chlamydia pneumoniae* CWL029 nfo ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_2 2507 *Bacillus subtilis* yqfS ENDONUCLEASE IV (EC 3_1_21_2)
 3_1_21_3 4292 *Yersinia pseudotuberculosis* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 5150 *Yersinia pseudotuberculosis* TYPE I RESTRICTION ENZYME ECOR124II R PROTEIN (EC 3_1_21_3)
 3_1_21_3 (ECoR124/3 I) (EC 3_1_21_3), specificity subunit
 3_1_21_3 494 *Streptococcus pyogenes* hsdR TYPE I RESTRICTION ENZYME ECOR124II R PROTEIN (EC 3_1_21_3)
 3_1_21_3 843 *Streptococcus pneumoniae* EC-hsdR TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 1580 *Streptococcus pneumoniae* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 (ECoR124/3 I) (EC 3_1_21_3), specificity subunit
 3_1_21_3 3373 *Salmonella typhimurium* hsr TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 3376 *Salmonella typhimurium* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 342 *Salmonella typhi* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 2612 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 2613 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 2614 *Salmonella paratyphi* TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 5307 *Salmonella enteritidis* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 4195 *Salmonella dublin* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 999 *Pasteurella multocida* hsdR TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 880 *Neisseria gonorrhoeae* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 205 *Mycoplasma pneumoniae* TYPE I RESTRICTION ENZYME (EC 3_1_21_3)
 3_1_21_3 490 *Mycoplasma pneumoniae* MP490 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 492 *Mycoplasma pneumoniae* MP492 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 791 *Helicobacter pylori* HP1402 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 1386 *Helicobacter pylori* HP0464 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 418 *Helicobacter pylori* J99 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 419 *Helicobacter pylori* J99 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 783 *Helicobacter pylori* J99trQ9ZKZ8 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 1412 *Helicobacter pylori* J99 hsdR_3 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 4131 *Haemophilus influenzae* HI0218 TYPE I RESTRICTION ENZYME PRRD (EC 3_1_21_3)
 3_1_21_3 15554 *Haemophilus influenzae* HI1285 TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 6454 *Escherichia coli* hsdR TYPE I RESTRICTION ENZYME ECOK I R PROTEIN (EC 3_1_21_3)
 3_1_21_3 1813 *Corynebacterium diphtheriae* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 2031 *Campylobacter jejuni* Cj1549c TYPE I RESTRICTION ENZYME HSDR (EC 3_1_21_3)
 3_1_21_3 2034 *Campylobacter jejuni* Cj1551c type I restriction enzyme CfrI (EC 3_1_21_3), specificity subunit
 3_1_21_4 154 *Ureaplasma urealyticum* UU036 TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_21_4)
 3_1_21_4 2144 *Streptococcus pneumoniae* TYPE II RESTRICTION ENZYME DPNI (EC 3_1_21_4)
 3_1_21_4 2163 *Streptococcus mutans* TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_21_4)
 3_1_21_4 1342 *Streptococcus equi* TYPE IIS RESTRICTION ENZYME FOKI (EC 3_1_21_4)
 3_1_21_4 1817 *Streptococcus equi* TYPE II RESTRICTION ENZYME BSUBI (EC 3_1_21_4)
 3_1_21_4 6212 *Salmonella typhimurium* TYPE IIS RESTRICTION ENZYME (EC 3_1_21_4) (EC 2_1_1_72)
 3_1_21_4 2009 *Porphyromonas gingivalis* TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_21_4)
 3_1_21_4 696 *Neisseria gonorrhoeae* TYPE II RESTRICTION ENZYME HPHI (EC 3_1_21_4)
 3_1_21_4 923 *Neisseria gonorrhoeae* TYPE II RESTRICTION ENZYME DPNI (EC 3_1_21_4)
 3_1_21_4 2049 *Neisseria gonorrhoeae* TYPE II RESTRICTION ENZYME NLAIV (EC 3_1_21_4)
 3_1_21_4 2081 *Neisseria gonorrhoeae* TYPE II RESTRICTION ENZYME NGOMI (EC 3_1_21_4)
 3_1_21_4 9457 *Haemophilus influenzae* HI1040 TYPE II RESTRICTION ENZYME HGIDI (EC 3_1_21_4)
 3_1_21_4 15264 *Haemophilus influenzae* HI1393 TYPE II RESTRICTION ENZYME HINDII (EC 3_1_21_4)
 3_1_21_4 20835 *Haemophilus influenzae* HI0512 TYPE II RESTRICTION ENZYME HINCII (EC 3_1_21_4)
 3_1_21_4 27 *Clostridium acetobutylicum* 35312755_C1_163 TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_21_4)

3_1_21_4 3994 *Clostridium acetobutylicum* 4110427_C3_2 TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_21_4)
 3_1_21_5 2715 *Salmonella typhimurium* res TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_21_5)
 3_1_21_5 135 *Salmonella typhi* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_21_5)
 3_1_21_5 3731 *Salmonella paratyphi* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_21_5)
 3_1_21_5 1265 *Salmonella enteritidis* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_21_5)
 3_1_21_5 921 *Salmonella dublin* TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_21_5)
 3_1_21_5 828 *Pasteurella multocida* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME RES (EC 3_1_21_5)
 3_1_21_5 1250 *Neisseria gonorrhoeae* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME RES (EC 3_1_21_5)
 3_1_21_5 1397 *Helicobacter pylori* J99tr|Q9ZJA3 TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME RES (EC 3_1_21_5)
 3_1_21_5 546 *Haemophilus ducreyi* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME RES (EC 3_1_21_5)
 3_1_21_5 9386 *Bordetella bronchiseptica* TYPE III RESTRICTION-MODIFICATION SYSTEM ECOPI ENZYME RES (EC 3_1_21_5)
 3_1_22_4 7017 *Yersinia pseudotuberculosis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 4544 *Yersinia pestis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 5644 *Vibrio cholerae* El Tor N16961 ORF02336 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 233 *Treponema pallidum* TP0517 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 4097 *Salmonella typhimurium* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 2599 *Salmonella typhi* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 3399 *Salmonella paratyphi* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 3400 *Salmonella paratyphi* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 1134 *Salmonella enteritidis* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 3983 *Salmonella dublin* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 117 *Rickettsia prowazekii* RP119 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 8002 *Pseudomonas aeruginosa* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 764 *Porphyromonas gingivalis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 1771 *Pasteurella multocida* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 1270 *Neisseria gonorrhoeae* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 488 *Mycobacterium tuberculosis* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 51 *Mycobacterium lepraespl*P40834 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 2767 *Mycobacterium leprae* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 1431 *Mycobacterium bovis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 4557 *Klebsiella pneumoniae* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)

3_1_22_4 296 *Helicobacter pylori* HP0877 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 810 *Helicobacter pylori* J99sp|Q9ZKX3 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 13968 *Haemophilus influenzae* HI0314 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 214 *Haemophilus ducreyi* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 5141 *Escherichia coli* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 20 *Corynebacterium diphtheriae* CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 2010 *Clostridium difficile* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 477 *Chlamydia trachomatis* D/UW-3/Cx EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 126 *Chlamydia pneumoniae* AR39 CP0126 CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 568 *Chlamydia pneumoniae* CWL029 EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 1086 *Campylobacter jejuni* ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_22_4 4317 *Bordetella pertussis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUVC (EC 3_1_22_4)
 3_1_25_1 1460 *Pasteurella multocida* ENDONUCLEASE V (EC 3_1_25_1)
 3_1_25_1 496 *Haemophilus ducreyi* ENDONUCLEASE V (EC 3_1_25_1)
 3_1_25_1 3688 *Bordetella pertussis* ENDONUCLEASE V (EC 3_1_25_1)
 3_1_25_1 7312 *Bordetella bronchiseptica* ENDONUCLEASE V (EC 3_1_25_1)
 3_1_27_1 3086 *Saccharomyces cerevisiae* RNY1 RIBONUCLEASE TRV (EC 3_1_27_1)
 3_1_27_3 1446 *Corynebacterium diphtheriae* GUANYL-SPECIFIC RIBONUCLEASE SA3 (EC 3_1_27_3)
 3_1_27_6 890 *Salmonella typhimurium* msA RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 2027 *Salmonella typhi* RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 3548 *Salmonella paratyphi* RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 2029 *Salmonella enteritidis* RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 4635 *Salmonella dublin* RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 8330 *Klebsiella pneumoniae* RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_27_6 4545 *Escherichia coli* ma RIBONUCLEASE I PRECURSOR (EC 3_1_27_6)
 3_1_3_10 1010 *Salmonella typhimurium* agp GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 4633 *Salmonella typhi* GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 1829 *Salmonella paratyphi* GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 1923 *Salmonella enteritidis* GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 4446 *Salmonella dublin* GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 6825 *Klebsiella pneumoniae* GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_10 965 *Escherichia coli* agp GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
 3_1_3_12 2803 *Salmonella typhimurium* otsB TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2354 *Salmonella typhi* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2957 *Salmonella paratyphi* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2958 *Salmonella paratyphi* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 3887 *Salmonella enteritidis* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2709 *Salmonella dublin* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 88 *Saccharomyces cerevisiae* TPS2 TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 6025 *Mycobacterium tuberculosis* otsB2 TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 1207 *Mycobacterium leprae* EC-otsB TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 511 *Mycobacterium bovis* EC-otsB TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2678 *Klebsiella pneumoniae* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2679 *Klebsiella pneumoniae* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 5167 *Escherichia coli* otsB TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 2036 *Enterococcus faecalis* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_12 1361 *Corynebacterium diphtheriae* TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
 3_1_3_15 7520 *Yersinia pseudotuberculosis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 362 *Yersinia pestis* EC-hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)

- 3_1_3_15 2284 *Yersinia pestis* EC-yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 4754 *Vibrio cholerae* El Tor N16961 ORF01207 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 4961 *Vibrio cholerae* El Tor N16961 ORF01480 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 1370 *Streptococcus mutans* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 507 *Salmonella typhimurium* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 5582 *Salmonella typhimurium* yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1207 *Salmonella typhi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-
 PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 4364 *Salmonella typhi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 639 *Salmonella paratyphi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1578 *Salmonella paratyphi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1579 *Salmonella paratyphi* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 / HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 294 *Salmonella enteritidis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-
 PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 664 *Salmonella enteritidis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 2216 *Saccharomyces cerevisiae* HIS2 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 2057 *Pseudomonas aeruginosa* PA0006 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1096 *Pasteurella multocida* EC-yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1892 *Pasteurella multocida* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 719 *Neisseria gonorrhoeae* EC-yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 5463 *Mycobacterium tuberculosis* Rv0114 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 4653 *Mycobacterium bovis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 3963 *Klebsiella pneumoniae* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 9270 *Klebsiella pneumoniae* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 280 *Helicobacter pylori* HP0860 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 793 *Helicobacter pylori* J99trQ9ZKY8 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1006 *Haemophilus influenzae* HI0471 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 1345 *Haemophilus influenzae* spP46452 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 565 *Haemophilus ducreyi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 566 *Haemophilus ducreyi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 200 *Escherichia coli* yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1970 *Escherichia coli* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-
 PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 2150 *Enterococcus faecium* (DOE) HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 515 *Clostridium difficile* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 2894 *Clostridium difficile* PROBABLE HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 3312 *Clostridium difficile* BS-ytvP HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 548 *Clostridium acetobutylicum* 7062510_C3_88 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 1130 *Clostridium acetobutylicum* 20709663_C1_38 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 895 *Campylobacter jejuni* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) /
 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 3_1_3_15 1541 *Campylobacter jejuni* Cj1152c HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 3926 *Bordetella pertussis* EC-yaeD HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_15 2956 *Bacillus subtilis* ytvP HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 3_1_3_27 4737 *Yersinia pseudotuberculosis* EC-pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC
 3_1_3_27)
 3_1_3_27 7440 *Yersinia pseudotuberculosis* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 456 *Yersinia pestis* EC-pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 2734 *Yersinia pestis* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 6039 *Vibrio cholerae* El Tor N16961 ORF02869 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC
 3_1_3_27)
 3_1_3_27 6245 *Vibrio cholerae* El Tor N16961 ORF03144 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC
 3_1_3_27)
 3_1_3_27 6554 *Vibrio cholerae* El Tor N16961 ORFA00938 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC
 3_1_3_27)
 3_1_3_27 1861 *Streptococcus pyogenes* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1695 *Streptococcus pneumoniae* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)

3_1_3_27 263 *Streptococcus mutans* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 523 *Streptococcus equi* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 2158 *Staphylococcus aureus* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 3107 *Staphylococcus aureus* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 2863 *Salmonella typhimurium* pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 5136 *Salmonella typhimurium* pgpA PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 829 *Salmonella typhi* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 2437 *Salmonella typhi* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 5045 *Salmonella paratyphi* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 6128 *Salmonella paratyphi* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1711 *Salmonella enteritidis* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1975 *Salmonella enteritidis* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 309 *Salmonella dublin* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 533 *Salmonella dublin* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 722 *Rickettsia prowazekii* RP750 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 841 *Rickettsia prowazekii* RP870 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 6660 *Pseudomonas aeruginosa* pgpA PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 857 *Pasteurella multocida* pgpA PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 1611 *Pasteurella multocida* pdpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 280 *Neisseria gonorrhoeae* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 3441 *Mycobacterium tuberculosis* Rv0308 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 266 *Mycobacterium bovis* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1100 *Klebsiella pneumoniae* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 3513 *Klebsiella pneumoniae* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 164 *Helicobacter pylori* HP0737 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 271 *Helicobacter pylori* HP0851 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 674 *Helicobacter pylori* J99tr|Q9ZLA6 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 2775 *Haemophilus influenzae* HI1306 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 17818 *Haemophilus influenzae* HI0211 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 663 *Haemophilus ducreyi* EC-pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 769 *Haemophilus ducreyi* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 402 *Escherichia coli* b0418 PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 1238 *Escherichia coli* pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 2283 *Enterococcus faecium* (DOE) PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 3856 *Enterococcus faecium* (DOE) PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1715 *Enterococcus faecalis* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1122 *Corynebacterium diphtheriae* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1465 *Corynebacterium diphtheriae* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 1769 *Clostridium difficile* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 559 *Clostridium acetobutylicum* 1464762_C3_45 PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 915 *Campylobacter jejuni* pgpA PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 1680 *Bordetella pertussis* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_27 3714 *Bordetella pertussis* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 8926 *Bordetella bronchiseptica* PHOSPHATIDYLGLYCEROPHOSPHATASE A (EC 3_1_3_27)
 3_1_3_27 9201 *Bordetella bronchiseptica* PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
 3_1_3_33 4737 *Saccharomyces cerevisiae* CTL1 POLYNUCLEOTIDE 5'-TRIPHOSPHATASE (EC 3_1_3_33)
 3_1_3_43 5464 *Saccharomyces cerevisiae* PTC5 [PYRUVATE DEHYDROGENASE (LIPOAMIDE) (PDP) (EC 3_1_3_43)
 3_1_3_68 324 *Saccharomyces cerevisiae* DOG1 2-DEOXYGLUCOSE-6-PHOSPHATE PHOSPHATASE 1 (EC 3_1_3_68)
 3_1_3_68 4035 *Saccharomyces cerevisiae* DOG2 2-DEOXYGLUCOSE-6-PHOSPHATE PHOSPHATASE 2 (EC 3_1_3_68)
 3_1_30_2 6201 *Salmonella typhimurium* NUCLEASE PRECURSOR (EC 3_1_30_2)
 3_1_30_2 4249 *Salmonella typhi* NUCLEASE PRECURSOR (EC 3_1_30_2)
 3_1_30_2 3546 *Salmonella paratyphi* NUCLEASE PRECURSOR (EC 3_1_30_2)
 3_1_30_2 2491 *Salmonella enteritidis* NUCLEASE PRECURSOR (EC 3_1_30_2)
 3_1_30_2 670 *Salmonella dublin* NUCLEASE PRECURSOR (EC 3_1_30_2)
 3_1_31_1 407 *Staphylococcus aureus* THERMONUCLEASE PRECURSOR (EC 3_1_31_1)

3_1_31_1 5715 *Salmonella typhi* MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 2375 *Pseudomonas aeruginosa* PA3727 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 8080 *Pseudomonas aeruginosa* PA5048 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 1702 *Pasteurella multocida* MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 7435 *Klebsiella pneumoniae* THERMONUCLEASE PRECURSOR (EC 3_1_31_1)
 3_1_31_1 1269 *Helicobacter pylori* HP0323 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 310 *Helicobacter pylori* J99tr|Q9ZMB5 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 11872 *Haemophilus influenzae* HI1296 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 1950 *Enterococcus faecalis* MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 3484 *Clostridium acetobutylicum* 35322143_C1_8 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 3830 *Clostridium acetobutylicum* 25523427_F2_1 MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 1830 *Campylobacter jejuni* Cj0979c MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 1762 *Bacillus subtilis* yncB MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_31_1 2159 *Bacillus subtilis* yokF MICROCOCCAL NUCLEASE (EC 3_1_31_1)
 3_1_4_14 6761 *Yersinia pseudotuberculosis* EC-acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 3891 *Yersinia pestis* EC-acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 6244 *Salmonella typhimurium* acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 4973 *Salmonella typhi* [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 1161 *Pseudomonas aeruginosa* acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 6043 *Pseudomonas aeruginosa* PA0785 [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 6146 *Pseudomonas aeruginosa* PA1962 [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 4450 *Mycoplasma genitalium* MG333 [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 4627 *Klebsiella pneumoniae* [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 4628 *Klebsiella pneumoniae* [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 11678 *Haemophilus influenzae* HI1366 ACYL CARRIER PROTEIN PHOSPHODIESTERASE (EC 3_1_4_14)
 3_1_4_14 4903 *Escherichia coli* acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 3170 *Enterococcus faecium* (DOE) [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 221 *Enterococcus faecalis* [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 2610 *Clostridium difficile* EC-acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 560 *Clostridium acetobutylicum* 1367202_C1_40 [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 4472 *Clostridium acetobutylicum* PUTATIVE ACYL CARRIER PROTEIN PHOSPHODIESTERASE (EC 3_1_4_14)
 3_1_4_14 3602 *Bordetella pertussis* EC-acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 7296 *Bordetella bronchiseptica* [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 1921 *Bacillus subtilis* yocJ [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_14 3349 *Bacillus subtilis* yvaB [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
 3_1_4_16 7144 *Yersinia pseudotuberculosis* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 1233 *Yersinia pestis* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 6182 *Vibrio cholerae* El Tor N16961 ORF03055 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 6314 *Vibrio cholerae* El Tor N16961 ORF03247 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 818 *Streptococcus mutans* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 1414 *Staphylococcus aureus* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 2996 *Staphylococcus aureus* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 3247 *Staphylococcus aureus* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 330 *Salmonella typhimurium* cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 2954 *Salmonella typhi* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 4377 *Salmonella paratyphi* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 4378 *Salmonella paratyphi* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)

3_1_4_16 4379 *Salmonella paratyphi* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 4380 *Salmonella paratyphi* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 1501 *Salmonella enteritidis* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 3659 *Salmonella dublin* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 952 *Porphyromonas gingivalis* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 1237 *Pasteurella multocida* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 6653 *Klebsiella pneumoniae* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 1061 *Helicobacter pylori* HP0104 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 100 *Helicobacter pylori* J99tr|Q9ZMW9 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 13456 *Haemophilus influenzae* HI0583 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 6378 *Escherichia coli* cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 454 *Enterococcus faecalis* 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 741 *Enterococcus faecalis* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_16 1596 *Clostridium acetobutylicum* 4863787_F1_2 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 3261 *Clostridium acetobutylicum* 245452_C2_12 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 784 *Bacillus subtilis* yfkN 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE (EC 3_1_4_16)
 3_1_4_16 918 *Bacillus subtilis* yhcR 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
 3_1_4_3 2654 *Staphylococcus aureus* PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 410 *Pseudomonas aeruginosa* plcH HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 1818 *Pseudomonas aeruginosa* plcN NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 1330 *Mycobacterium tuberculosis* plcC NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 1331 *Mycobacterium tuberculosis* plcB NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 1332 *Mycobacterium tuberculosis* plcA NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 2600 *Mycobacterium tuberculosis* plcD NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 3063 *Mycobacterium leprae* NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 3979 *Mycobacterium bovis*|Q9XB13 NON-HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_4_3 3406 *Clostridium acetobutylicum* 25595038_F3_4 PHOSPHOLIPASE C (EC 3_1_4_3)
 3_1_4_3 3797 *Clostridium acetobutylicum* 9861558_F2_2 PHOSPHOLIPASE C (EC 3_1_4_3)
 3_1_4_3 1814 *Bordetella pertussis* HEMOLYTIC PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
 3_1_5_1 7234 *Yersinia pseudotuberculosis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 2059 *Yersinia pestis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 5774 *Vibrio cholerae* El Tor N16961 ORF02497 DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 6819 *Vibrio cholerae* El Tor N16961 ORFA01278 DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1964 *Salmonella typhimurium* dgt DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1960 *Salmonella typhi* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)

3_1_5_1 3926 *Salmonella paratyphi* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 3927 *Salmonella paratyphi* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 4163 *Salmonella dublin* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 63 *Rickettsia prowazekii* RP064 DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 6937 *Pseudomonas aeruginosa* dgt DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 7767 *Pseudomonas aeruginosa* PA3043 DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 883 *Porphyromonas gingivalis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1699 *Pasteurella multocida* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1325 *Mycobacterium tuberculosis* dgt DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 60 *Mycobacterium leprae* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 2078 *Mycobacterium bovis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 2912 *Klebsiella pneumoniae* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 2769 *Haemophilus influenzae* HI1299 DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 6359 *Haemophilus influenzae* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 160 *Escherichia coli* dgt DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1504 *Enterococcus faecalis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 1447 *Corynebacterium diphtheriae* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 4161 *Bordetella pertussis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 4934 *Bordetella bronchiseptica* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_5_1 8121 *Bordetella bronchiseptica* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
 3_1_6_6 559 *Pseudomonas aeruginosa* betC CHOLINE-SULFATASE (EC 3_1_6_6)
 3_1_6_6 8786 *Bordetella bronchiseptica* CHOLINE-SULFATASE (EC 3_1_6_6)
 3_1_6_6 9144 *Bordetella bronchiseptica* CHOLINE-SULFATASE (EC 3_1_6_6)
 3_1_7_2 7363 *Yersinia pseudotuberculosis* BS-relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 2303 *Yersinia pestis* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 6458 *Vibrio cholerae* El Tor N16961 ORF03429 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 418 *Ureaplasma urealyticum* UU283 PROBABLE GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 595 *Streptococcus pyogenes* relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 171 *Streptococcus pneumoniae* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1746 *Streptococcus pneumoniae* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1012 *Streptococcus mutans* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1877 *Streptococcus equi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)

3_1_7_2 38 *Staphylococcus aureus* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 6029 *Salmonella typhimurium* spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 2094 *Salmonella typhi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 93 *Salmonella paratyphi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 94 *Salmonella paratyphi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 187 *Salmonella paratyphi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3627 *Salmonella paratyphi* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 306 *Rickettsia prowazekii* RP312 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 602 *Rickettsia prowazekii* RP624 PROBABLE GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 603 *Rickettsia prowazekii* RP625 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3306 *Pseudomonas aeruginosa* PA0431 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 6941 *Pseudomonas aeruginosa* spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1011 *Porphyromonas gingivalis* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1725 *Pasteurella multocida* spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1028 *Neisseria gonorrhoeae* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 442 *Mycoplasma pneumoniae* MP442 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1607 *Mycoplasma genitalium* MG278 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 472 *Mycobacterium tuberculosis* relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 37 *Mycobacterium lepraes* Q49640 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1887 *Mycobacterium bovis* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 7952 *Klebsiella pneumoniae* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 7953 *Klebsiella pneumoniae* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 201 *Helicobacter pylori* HP0775 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 712 *Helicobacter pylori* J99 spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 18233 *Haemophilus influenzae* HI1741 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 44 *Haemophilus ducreyi* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3570 *Escherichia coli* spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3000 *Enterococcus faecium* (DOE) GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1791 *Enterococcus faecalis* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1069 *Corynebacterium diphtheriae* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 1921 *Corynebacterium diphtheriae* GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)

3_1_7_2 2459 *Clostridium difficile* BS-relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3002 *Clostridium acetobutylicum* 26757037_C1_24 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 3003 *Clostridium acetobutylicum* 26214063_C1_23 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 2633 *Campylobacter jejuni* spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 543 *Borrelia burgdorferi* BB0198 GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 4193 *Bordetella pertussis* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 8956 *Bordetella bronchiseptica* EC-spoT GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_1_7_2 2753 *Bacillus subtilis* relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
 3_11_1_1 7112 *Vibrio cholerae* El Tor N16961ORFA00274 phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 907 *Salmonella typhimurium* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 1623 *Salmonella typhi* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 5021 *Salmonella paratyphi* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 579 *Salmonella enteritidis* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 427 *Salmonella dublin* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 466 *Pseudomonas aeruginosa* phnX phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 8130 *Pseudomonas aeruginosa* PA2803 phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 8359 *Klebsiella pneumoniae* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 609 *Enterococcus faecium* (DOE) phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 396 *Bordetella pertussis* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 1936 *Bordetella pertussis* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_1 1937 *Bordetella pertussis* phosphonoacetaldehyde hydrolase (EC 3_11_1_1)
 3_11_1_2 5981 *Bordetella bronchiseptica* PHOSPHONOACETATE HYDROLASE (EC 3_11_1_2)
 3_2_1_11 139 *Streptococcus mutans* DEXTRANASE PRECURSOR (EC 3_2_1_11)
 3_2_1_122 6142 *Escherichia coli* glvG MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 2566 *Enterococcus faecium* (DOE) MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 186 *Clostridium difficile* EC-glvG MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 1473 *Clostridium difficile* MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 1587 *Clostridium difficile* MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 2246 *Clostridium difficile* MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 3506 *Clostridium difficile* MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 17 *Clostridium acetobutylicum* 24648390_F2_51 MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 947 *Clostridium acetobutylicum* 812552_C2_35 MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 713 *Bacillus subtilis* lplD MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_122 818 *Bacillus subtilis* glvA MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)
 3_2_1_135 516 *Clostridium difficile* BS-yvdF NEOPULLULANASE (EC 3_2_1_135)
 3_2_1_135 1042 *Clostridium acetobutylicum* 4462692_F2_26 neopullulanase (EC 3_2_1_135)
 3_2_1_135 1043 *Clostridium acetobutylicum* 14635927_F1_9 neopullulanase (EC 3_2_1_135)
 3_2_1_135 3457 *Bacillus subtilis* yvdF CYCLOMALTODEXTRINASE (EC 3_2_1_54)/NEOPULLULANASE (EC 3_2_1_135)
 3_2_1_141 1364 *Salmonella typhimurium* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 716 *Salmonella typhi* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 3510 *Salmonella paratyphi* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 3896 *Salmonella enteritidis* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 2335 *Salmonella dublin* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 5452 *Pseudomonas aeruginosa* PA2164 MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 1185 *Mycobacterium tuberculosis* glgZ MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)

3_2_1_141 4 *Mycobacterium bovis* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 1424 *Bordetella pertussis* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_141 9667 *Bordetella bronchiseptica* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_15 1800 *Streptococcus pneumoniae* POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_15 959 *Staphylococcus aureus* POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_15 2401 *Saccharomyces cerevisiae* PGU1 PROBABLE POLYGALACTURONASE YJR153W PRECURSOR (EC 3_2_1_15)
 3_2_1_15 663 *Escherichia coli* b0689 POLYGALACTURONASE PRECURSOR (EC 3_2_1_15)
 3_2_1_15 1871 *Enterococcus faecium* (DOE) POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_15 574 *Clostridium acetobutylicum* 30272300_C1_41 POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_15 2305 *Clostridium acetobutylicum* 188811_F3_6 POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_26 7161 *Vibrio cholerae* El Tor N16961ORFA00334 SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 118 *Streptococcus pyogenes* scrB SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 925 *Streptococcus pneumoniae* SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 1094 *Streptococcus pneumoniae* BS-sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 134 *Streptococcus mutans* BS-sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 1 *Streptococcus equi* BS-sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 203 *Staphylococcus aureus* BS-sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 3106 *Saccharomyces cerevisiae* SUC2 INVERTASE 2 (EC 3_2_1_26)
 3_2_1_26 1122 *Pasteurella multocida* scrB SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 6405 *Klebsiella pneumoniae* SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 8027 *Klebsiella pneumoniae* SUCROSE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 651 *Enterococcus faecium* (DOE) BETA-FRUCTOSIDASE (EC 3_2_1_26)
 3_2_1_26 492 *Enterococcus faecalis* SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 1058 *Enterococcus faecalis* SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 114 *Corynebacterium diphtheriae* SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 1056 *Clostridium difficile* BS-sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 599 *Clostridium acetobutylicum* 657827_C1_44 SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_26 3797 *Bacillus subtilis* sacA SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_3 661 *Saccharomyces cerevisiae* SGA1 GLUCOAMYLASE, INTRACELLULAR SPORULATION-SPECIFIC (EC 3_2_1_3)
 3_2_1_3 2103 *Saccharomyces cerevisiae* YMR317W GLUCOAMYLASE S1/S2 (EC 3_2_1_3)
 3_2_1_3 4278 *Saccharomyces cerevisiae* MUC1 GLUCOAMYLASE S1/S2 (EC 3_2_1_3)
 3_2_1_3 5542 *Saccharomyces cerevisiae* YDL037C GLUCOAMYLASE S1/S2 (EC 3_2_1_3)
 3_2_1_3 6869 *Saccharomyces cerevisiae* YJR151C GLUCOAMYLASE S1/S2 (EC 3_2_1_3)
 3_2_1_3 161 *Neurospora crassa* gla-1 GLUCOAMYLASE PRECURSOR (EC 3_2_1_3)
 3_2_1_3 20249 *Neurospora crassa* GLUCOAMYLASE (EC 3_2_1_3)
 3_2_1_3 577 *Mycobacterium tuberculosis* Rv2402 GLUCOAMYLASE G1 AND G2 PRECURSOR (EC 3_2_1_3)
 3_2_1_3 2347 *Mycobacterium leprae* GLUCOAMYLASE G1 AND G2 PRECURSOR (EC 3_2_1_3)
 3_2_1_3 2296 *Mycobacterium bovis* GLUCOAMYLASE G1 AND G2 PRECURSOR (EC 3_2_1_3)
 3_2_1_4 5496 *Yersinia pseudotuberculosis* EC-yhjM ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 3516 *Yersinia pestis* EC-yhjM ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 244 *Streptococcus pneumoniae* BS-yhfE ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 2194 *Staphylococcus aureus* BS-yhfE ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 2723 *Salmonella typhimurium* bcsC ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 2742 *Salmonella typhi* ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 886 *Salmonella paratyphi* ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 3498 *Salmonella enteritidis* ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 3942 *Salmonella dublin* ENDOGLUCANASE PRECURSOR (EC 3_2_1_4)
 3_2_1_4 1964 *Pseudomonas aeruginosa* PA3461 ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 2876 *Mycobacterium tuberculosis* Rv1090 ENDOGLUCANASE I PRECURSOR (EC 3_2_1_4)
 3_2_1_4 3522 *Mycobacterium tuberculosis* celA ENDOGLUCANASE A PRECURSOR (EC 3_2_1_4)
 3_2_1_4 5780 *Mycobacterium tuberculosis* Rv1987 ENDOGLUCANASE E-4 PRECURSOR (EC 3_2_1_4)
 3_2_1_4 47 *Mycobacterium bovis* ENDOGLUCANASE A PRECURSOR (EC 3_2_1_4)
 3_2_1_4 2050 *Mycobacterium bovis* ENDOGLUCANASE I PRECURSOR (EC 3_2_1_4)
 3_2_1_4 4529 *Mycobacterium bovis* ENDOGLUCANASE E-4 PRECURSOR (EC 3_2_1_4)
 3_2_1_4 3008 *Klebsiella pneumoniae* ENDOGLUCANASE (EC 3_2_1_4)

3_2_1_4 3009 *Klebsiella pneumoniae* ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 5843 *Klebsiella pneumoniae* ENDOGLUCANASE PRECURSOR (EC 3_2_1_4)
 3_2_1_4 6063 *Escherichia coli* yhjM ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 1437 *Enterococcus faecium* (DOE) ENDOGLUCANASE M (EC 3_2_1_4)
 3_2_1_4 380 *Clostridium difficile* BS-yhfE ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 2852 *Clostridium difficile* ENDOGLUCANASE H PRECURSOR (EC 3_2_1_4)
 3_2_1_4 103 *Clostridium acetobutylicum* 34417250_C1_120 ENDOGLUCANASE D (EC 3_2_1_4)
 3_2_1_4 173 *Clostridium acetobutylicum* 19532877_F1_34 ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 733 *Clostridium acetobutylicum* 36521883_C3_59 ENDOGLUCANASE M (EC 3_2_1_4)
 3_2_1_4 734 *Clostridium acetobutylicum* 14742887_C2_50 ENDOGLUCANASE M (EC 3_2_1_4)
 3_2_1_4 735 *Clostridium acetobutylicum* 1070328_C3_58 ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 942 *Clostridium acetobutylicum* 39843_C2_37 ENDOGLUCANASE E (EC 3_2_1_4)
 3_2_1_4 949 *Clostridium acetobutylicum* 30203377_C3_76 ENDOGLUCANASE G (EC 3_2_1_4)
 3_2_1_4 950 *Clostridium acetobutylicum* 23464218_C3_75 ENDOGLUCANASE A (EC 3_2_1_4)
 3_2_1_4 953 *Clostridium acetobutylicum* 7063812_C1_59 ENDOGLUCANASE G (EC 3_2_1_4)
 3_2_1_4 954 *Clostridium acetobutylicum* 24414135_C1_58 ENDOGLUCANASE B (EC 3_2_1_4) /
 EXOGLUCANASE (EC 3_2_1_91)
 3_2_1_4 955 *Clostridium acetobutylicum* 1204687_C3_73 ENDOGLUCANASE F (EC 3_2_1_4)
 3_2_1_4 1106 *Clostridium acetobutylicum* 13875443_F2_24 ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 1622 *Clostridium acetobutylicum* 14252318_C1_17 ENDOGLUCANASE D (EC 3_2_1_4)
 3_2_1_4 1624 *Clostridium acetobutylicum* 23675260_C3_36 ENDOGLUCANASE D (EC 3_2_1_4)
 3_2_1_4 2244 *Clostridium acetobutylicum* 23564813_C2_29 ENDOGLUCANASE G (EC 3_2_1_4)
 3_2_1_4 2770 *Clostridium acetobutylicum* 4703218_C1_17 ENDOGLUCANASE B (EC 3_2_1_4)
 3_2_1_4 3429 *Clostridium acetobutylicum* 34188805_C2_19 ENDOGLUCANASE G (EC 3_2_1_4)
 3_2_1_4 3431 *Clostridium acetobutylicum* 9767887_C1_16 ENDOGLUCANASE G (EC 3_2_1_4)
 3_2_1_4 3650 *Clostridium acetobutylicum* 914840_F3_3 ENDOGLUCANASE H (EC 3_2_1_4)
 3_2_1_4 1020 *Bacillus subtilis* yhfE ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_4 1812 *Bacillus subtilis* bglC ENDOGLUCANASE PRECURSOR (EC 3_2_1_4)
 3_2_1_4 1861 *Bacillus subtilis* yoaJ MAJOR EXTRACELLULAR ENDOGLUCANASE PRECURSOR (EC
 3_2_1_4)
 3_2_1_4 2876 *Bacillus subtilis* ysdC ENDOGLUCANASE M (EC 3_2_1_4)
 3_2_1_41 197 *Streptococcus pyogenes* pulA PULLULANASE (EC 3_2_1_41)
 3_2_1_41 240 *Streptococcus pneumoniae* PULLULANASE (EC 3_2_1_41)
 3_2_1_41 1354 *Streptococcus pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 684 *Streptococcus equi* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 731 *Streptococcus equi* PULLULANASE (EC 3_2_1_41)
 3_2_1_41 306 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 2346 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 2347 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 3125 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 3127 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 3128 *Klebsiella pneumoniae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 211 *Corynebacterium diphtheriae* PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 393 *Clostridium difficile* PULLULANASE (EC 3_2_1_41)
 3_2_1_41 1034 *Clostridium acetobutylicum* 891882_F1_5 PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_41 3863 *Clostridium acetobutylicum* 3141500_C3_4 PULLULANASE (EC 3_2_1_41)
 3_2_1_41 2987 *Bacillus subtilis* amyX PULLULANASE PRECURSOR (EC 3_2_1_41)
 3_2_1_54 769 *Streptococcus pyogenes* amyB CYCLOMALTODEXTRINASE (EC 3_2_1_54)
 3_2_1_54 1205 *Streptococcus equi* BS-yvdF CYCLOMALTODEXTRINASE (EC 3_2_1_54)
 3_2_1_54 2146 *Mycobacterium leprae* CYCLOMALTODEXTRINASE (EC 3_2_1_54)
 3_2_1_54 3457 *Bacillus subtilis* yvdF CYCLOMALTODEXTRINASE (EC 3_2_1_54)/NEOPULLULANASE (EC
 3_2_1_135)
 3_2_1_55 2898 *Enterococcus faecium* (DOE) BS-abfA ALPHA-L-ARABINOFURANOSIDASE I (EC 3_2_1_55)
 3_2_1_55 20 *Clostridium acetobutylicum* 3949092_F3_100 ALPHA-L-ARABINOFURANOSIDASE (EC
 3_2_1_55)
 3_2_1_55 3970 *Clostridium acetobutylicum* 17038412_F2_1 BETA-XYLOSIDASE (EC 3_2_1_37) / ALPHA-L-
 ARABINOFURANOSIDASE (EC 3_2_1_55)
 3_2_1_55 2845 *Bacillus subtilis* xsa ALPHA-L-ARABINOFURANOSIDASE (EC 3_2_1_55)
 3_2_1_55 2866 *Bacillus subtilis* abfA ALPHA-L-ARABINOFURANOSIDASE I (EC 3_2_1_55)
 3_2_1_58 3283 *Saccharomyces cerevisiae* EXG1 GLUCAN 1,3-BETA-GLUCOSIDASE I/II PRECURSOR (EC
 3_2_1_58)

3_2_1_58 3959 *Saccharomyces cerevisiae* EXG2 GLUCAN 1,3-BETA-GLUCOSIDASE 2 PRECURSOR (EC 3_2_1_58)
 3_2_1_58 4377 *Saccharomyces cerevisiae* BGL2 GLUCAN 1,3-BETA-GLUCOSIDASE PRECURSOR (EC 3_2_1_58)
 3_2_1_58 6951 *Saccharomyces cerevisiae* SPRI SPORULATION-SPECIFIC GLUCAN 1,3-BETA-GLUCOSIDASE PRECURSOR (EC 3_2_1_58)
 3_2_1_58 3959 *Pseudomonas aeruginosa* PA1163 GLUCAN 1,3-BETA-GLUCOSIDASE PRECURSOR (EC 3_2_1_58)
 3_2_1_58 20395 *Neurospora crassa* GLUCAN 1,3-BETA-GLUCOSIDASE PRECURSOR (EC 3_2_1_58)
 3_2_1_58 2958 *Clostridium difficile* GLUCAN 1,3-BETA-GLUCOSIDASE I/II PRECURSOR (EC 3_2_1_58)
 3_2_1_65 3452 *Clostridium acetobutylicum* 23600003_F1_2 LEVANASE (EC 3_2_1_65)
 3_2_1_65 2696 *Bacillus subtilis* sacC LEVANASE (EC 3_2_1_65)
 3_2_1_65 3441 *Bacillus subtilis* yveB LEVANASE (EC 3_2_1_65)
 3_2_1_70 48 *Streptococcus pyogenes* dexB GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_70 1375 *Streptococcus pneumoniae* trjO07337 GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_70 1417 *Streptococcus mutans* BS-yvdL GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_70 707 *Streptococcus equi* BS-yvdL GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_70 1389 *Enterococcus faecium* (DOE) GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_70 2606 *Enterococcus faecalis* GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_73 1672 *Streptococcus mutans* EC-yhjM BETA-GLUCANASE PRECURSOR (EC 3_2_1_73)
 3_2_1_73 478 *Clostridium acetobutylicum* 35320300_C1_60 BETA-GLUCANASE (EC 3_2_1_73)
 3_2_1_73 3900 *Bacillus subtilis* bglS BETA-GLUCANASE PRECURSOR (EC 3_2_1_73)
 3_2_1_74 2831 *Clostridium acetobutylicum* 35394681_F1_1 glucan 1,4-beta-glucosidase (EC 3_2_1_74)
 3_2_1_78 939 *Clostridium acetobutylicum* 5267842_C2_39 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_78 940 *Clostridium acetobutylicum* 34178552_C1_33 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_78 941 *Clostridium acetobutylicum* 26361302_C2_38 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_78 3531 *Clostridium acetobutylicum* 15785442_C2_7 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_78 3532 *Clostridium acetobutylicum* 7308402_C2_6 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_78 588 *Bacillus subtilis* ydhT MANNAN ENDO-1,4-BETA-MANNOSIDASE (EC 3_2_1_78)
 3_2_1_8 6615 *Vibrio cholerae* El Tor N16961ORFA01011 ENDO-1,4-BETA-XYLANASE A PRECURSOR (EC 3_2_1_8)
 3_2_1_8 1312 *Streptococcus mutans* ENDO-1,4-BETA-XYLANASE B (EC 3_2_1_8)
 3_2_1_8 8136 *Pseudomonas aeruginosa* PA2783 ENDO-1,4-BETA-XYLANASE A PRECURSOR (EC 3_2_1_8)
 3_2_1_8 587 *Mycobacterium leprae* ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 4055 *Klebsiella pneumoniae* ENDO-1,4-BETA-XYLANASE Z PRECURSOR (EC 3_2_1_8)
 3_2_1_8 6161 *Escherichia coli* yieL ENDO-1,4-BETA-XYLANASE Z PRECURSOR (EC 3_2_1_8)
 3_2_1_8 1650 *Enterococcus faecalis* BS-yjeA ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 1151 *Clostridium difficile* ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 1189 *Clostridium difficile* ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 996 *Clostridium acetobutylicum* 3995468_F2_15 ENDO-1,4-BETA-XYLANASE B (EC 3_2_1_8)
 3_2_1_8 1158 *Clostridium acetobutylicum* 3386541_C2_41 ENDO-1,4-BETA-XYLANASE A (EC 3_2_1_8)
 3_2_1_8 1161 *Clostridium acetobutylicum* 4725453_C1_34 ENDO-1,4-BETA-XYLANASE Z (EC 3_2_1_8)
 3_2_1_8 1162 *Clostridium acetobutylicum* 26369562_C3_47 ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 1266 *Clostridium acetobutylicum* 36229625_F1_2 ENDO-1,4-BETA-XYLANASE Z (EC 3_2_1_8)
 3_2_1_8 3497 *Clostridium acetobutylicum* 23631300_C1_10 ENDO-1,4-BETA-XYLANASE A (EC 3_2_1_8)
 3_2_1_8 3558 *Clostridium acetobutylicum* 821093_F1_1 ENDO-1,4-BETA-XYLANASE Z (EC 3_2_1_8)
 3_2_1_8 965 *Bacillus subtilis* yheN ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 1211 *Bacillus subtilis* yjeA ENDO-1,4-BETA-XYLANASE D (EC 3_2_1_8)
 3_2_1_8 1882 *Bacillus subtilis* xynA ENDO-1,4-BETA-XYLANASE A (EC 3_2_1_8)
 3_2_1_8 3926 *Bacillus subtilis* yxiA ENDO-1,4-BETA-XYLANASE Z (EC 3_2_1_8)
 3_2_1_80 532 *Streptococcus mutans* FRUCTAN BETA-FRUCTOSIDASE PRECURSOR (EC 3_2_1_80)
 3_2_1_81 2950 *Pseudomonas aeruginosa* PA1046 BETA-AGARASE B (EC 3_2_1_81)
 3_2_1_83 51 *Clostridium acetobutylicum* 22439426_F3_127 KAPPA-CARRAGEENASE (EC 3_2_1_83)
 3_2_1_85 168 *Streptococcus pyogenes* lacG 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 144 *Streptococcus pneumoniae* 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 1451 *Streptococcus pneumoniae* 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 1373 *Streptococcus mutans* 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)

3_2_1_85 365 *Staphylococcus aureus* sp|P11175 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 2998 *Escherichia coli* ebgA 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 2951 *Enterococcus faecium* (DOE) 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 498 *Enterococcus faecalis* 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_85 3038 *Clostridium acetobutylicum* 24805252_F2_4 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_86 6489 *Yersinia pseudotuberculosis* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 7889 *Yersinia pseudotuberculosis* EC-celF 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2467 *Yersinia pestis* EC-celF PROBABLE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2518 *Yersinia pestis* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 5109 *Vibrio cholerae* El Tor N16961 ORF01667 PROBABLE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5364 *Vibrio cholerae* El Tor N16961 ORF01994 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 395 *Streptococcus pyogenes* bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 494 *Streptococcus pneumoniae* EC-bglB 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 590 *Streptococcus pneumoniae* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 901 *Streptococcus pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 400 *Streptococcus mutans* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1031 *Streptococcus mutans* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1871 *Streptococcus mutans* EC-bglB 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 477 *Streptococcus equi* BS-bglH 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1877 *Staphylococcus aureus* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5305 *Salmonella typhimurium* bglA 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 6186 *Salmonella typhimurium* celF 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 564 *Salmonella typhi* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3604 *Salmonella typhi* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2964 *Salmonella paratyphi* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2965 *Salmonella paratyphi* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 4784 *Salmonella paratyphi* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 241 *Salmonella enteritidis* 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 2352 *Salmonella enteritidis* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 949 *Salmonella dublin* 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 4200 *Salmonella dublin* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1669 *Klebsiella pneumoniae* PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3034 *Klebsiella pneumoniae* PROBABLE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3930 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3931 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 4084 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5265 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_86 5490 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5491 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5492 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5653 *Klebsiella pneumoniae* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 7042 *Klebsiella pneumoniae* PROBABLE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 7043 *Klebsiella pneumoniae* PROBABLE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2645 *Escherichia coli* ascB 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 5069 *Escherichia coli* celF 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 6535 *Escherichia coli* bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 6551 *Escherichia coli* bglB 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1705 *Enterococcus faecium* (DOE) 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1706 *Enterococcus faecium* (DOE) 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3825 *Enterococcus faecium* (DOE) 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 490 *Enterococcus faecalis* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 671 *Enterococcus faecalis* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1167 *Enterococcus faecalis* EC-celF 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1192 *Enterococcus faecalis* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1402 *Enterococcus faecalis* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1403 *Enterococcus faecalis* EC-ascB 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 567 *Clostridium difficile* EC-celF 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 973 *Clostridium difficile* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)

3_2_1_86 1123 *Clostridium difficile* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1484 *Clostridium difficile* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2737 *Clostridium difficile* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3491 *Clostridium difficile* BS-bglH 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3492 *Clostridium difficile* 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 307 *Clostridium acetobutylicum* 978437_C1_70 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 386 *Clostridium acetobutylicum* 20980052_F3_47 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 497 *Clostridium acetobutylicum* 34413187_C2_63 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 1894 *Clostridium acetobutylicum* 36225012_C3_26 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 2681 *Clostridium acetobutylicum* 10820338_F1_3 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 342 *Bacillus subtilis* yckE 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3849 *Bacillus subtilis* licH 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 3919 *Bacillus subtilis* bglH 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_86 4005 *Bacillus subtilis* bglA 6-PHOSPHO-BETA-GLUCOSIDASE (EC 3_2_1_86)
 3_2_1_89 4501 *Yersinia pseudotuberculosis* ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_89 1119 *Yersinia pestis* BS-yvfO ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_89 7095 *Klebsiella pneumoniae* ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_89 7096 *Klebsiella pneumoniae* ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_89 2952 *Enterococcus faecium* (DOE) BS-yvfO ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_89 3186 *Clostridium acetobutylicum* 20604827_F1_1 ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE (EC 3_2_1_89)
 3_2_1_89 3407 *Bacillus subtilis* yvfO ARABINO GALACTAN ENDO-1,4-BETA-GALACTOSIDASE (EC 3_2_1_89)
 3_2_1_91 101 *Neurospora crassa* CBH-1 EXOGLUCANASE 1 PRECURSOR (EC 3_2_1_91)
 3_2_1_91 954 *Clostridium acetobutylicum* 24414135_C1_58 ENDOGLUCANASE B (EC 3_2_1_4) / EXOGLUCANASE (EC 3_2_1_91)
 3_2_1_91 2431 *Clostridium acetobutylicum* 33788263_C2_30 cellulose 1,4-beta-cellobiosidase (EC 3_2_1_91)
 3_2_1_93 5327 *Yersinia pseudotuberculosis* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 3394 *Yersinia pestis* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 4757 *Vibrio cholerae* El Tor N16961 ORF01211 TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 508 *Streptococcus pyogenes* dexS TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 558 *Streptococcus pneumoniae* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 1556 *Streptococcus mutans* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 3827 *Staphylococcus aureus* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 5505 *Salmonella typhimurium* olgH TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 850 *Salmonella typhi* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 1451 *Salmonella paratyphi* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 1452 *Salmonella paratyphi* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 2658 *Salmonella enteritidis* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 1310 *Salmonella dublin* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 7048 *Klebsiella pneumoniae* TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 6388 *Escherichia coli* treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 1352 *Enterococcus faecium* (DOE) EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 3496 *Clostridium difficile* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_93 781 *Bacillus subtilis* treA TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_99 2875 *Bacillus subtilis* abnA ARABINAN ENDO-1,5-ALPHA-L-ARABINOSIDASE A (EC 3_2_1_99)
 3_2_2_1 1353 *Staphylococcus aureus* EC-yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 2631 *Staphylococcus aureus* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)

3_2_2_1 3427 *Salmonella typhimurium* yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 6382 *Salmonella typhimurium* ybeK INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 126 *Salmonella typhi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 4277 *Salmonella typhi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3596 *Salmonella paratyphi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3597 *Salmonella paratyphi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 4886 *Salmonella paratyphi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 7253 *Salmonella paratyphi* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3872 *Salmonella enteritidis* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1489 *Saccharomyces cerevisiae* URH1 INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3245 *Pseudomonas aeruginosa* PA0143 INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 787 *Pasteurella multocida* iunH INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1884 *Mycobacterium tuberculosis* iunH INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1475 *Mycobacterium bovis* EC-ybeK INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 2268 *Mycobacterium bovis* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1890 *Klebsiella pneumoniae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3315 *Klebsiella pneumoniae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3316 *Klebsiella pneumoniae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 30 *Escherichia coli* yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 4573 *Escherichia coli* ybeK INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 5314 *Escherichia coli* yeiK INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1213 *Enterococcus faecium* (DOE) INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 680 *Enterococcus faecalis* EC-yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1320 *Corynebacterium diphtheriae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 1321 *Corynebacterium diphtheriae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 2110 *Corynebacterium diphtheriae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 2120 *Corynebacterium diphtheriae* INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 3250 *Clostridium difficile* EC-yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_1 2316 *Campylobacter jejuni* Cj0340 INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_20 8086 *Yersinia pseudotuberculosis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 2324 *Yersinia pestis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 5471 *Vibrio cholerae* El Tor N16961 ORF02140 DNA-3-METHYLADENINE GLYCOSYLASE I (EC 3_2_2_20)
 3_2_2_20 629 *Streptococcus pyogenes* tag DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1211 *Streptococcus pneumoniae* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)

3_2_2_20 1561 *Streptococcus mutans* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1564 *Streptococcus equi* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 2558 *Staphylococcus aureus* tag DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 2340 *Salmonella typhimurium* tag DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 2937 *Salmonella typhi* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 4001 *Salmonella paratyphi* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 4025 *Salmonella enteritidis* DNA-3-METHYLADENINE GLYCOSYLASE I (EC 3_2_2_20)
 3_2_2_20 562 *Pseudomonas aeruginosa* tag DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 7840 *Pseudomonas aeruginosa* PA1193 DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 358 *Pasteurella multocida* tagI DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 273 *Neisseria gonorrhoeae* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 5079 *Mycobacterium tuberculosis* tagA DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1119 *Mycobacterium leprae* tagQ49957 DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 2681 *Mycobacterium bovis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 6632 *Klebsiella pneumoniae* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 16893 *Haemophilus influenzae* HI0654 DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 3469 *Escherichia coli* tag DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1397 *Enterococcus faecalis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1534 *Enterococcus faecalis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 1574 *Corynebacterium diphtheriae* DNA-3-METHYLADENINE GLYCOSYLASE I (EC 3_2_2_20)
 3_2_2_20 3683 *Bordetella pertussis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_20 6172 *Bordetella bronchiseptica* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_23 5180 *Yersinia pseudotuberculosis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 4844 *Yersinia pestis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 4103 *Vibrio cholerae* El Tor N16961 ORF00315 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 557 *Ureaplasma urealyticum* UU413 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1190 *Streptococcus pyogenes* fpg FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 192 *Streptococcus pneumoniae* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 89 *Streptococcus mutans* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1501 *Streptococcus equi* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1441 *Staphylococcus aureus* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1003 *Salmonella typhimurium* fpg FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1322 *Salmonella typhi* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1035 *Salmonella paratyphi* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1036 *Salmonella paratyphi* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1046 *Salmonella enteritidis* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 662 *Salmonella dublin* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 6992 *Pseudomonas aeruginosa* mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1838 *Pasteurella multocida* fpg FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1674 *Neisseria gonorrhoeae* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 458 *Mycoplasma pneumoniae* MP458 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1575 *Mycoplasma genitalium* sp|P55825 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 51 *Mycobacterium tuberculosis* Rv0944 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2864 *Mycobacterium tuberculosis* nei FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 3096 *Mycobacterium tuberculosis* Rv2464c FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 3983 *Mycobacterium tuberculosis* fpg FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)

3_2_2_23 795 *Mycobacterium leprae* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2234 *Mycobacterium leprae* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2235 *Mycobacterium leprae* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1774 *Mycobacterium bovis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2360 *Mycobacterium bovis* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2398 *Mycobacterium bovis* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2962 *Mycobacterium bovis* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 16255 *Haemophilus influenzae* HI0946 FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1549 *Haemophilus ducreyi* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 6116 *Escherichia coli* mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1250 *Enterococcus faecium* (DOE) FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 540 *Enterococcus faecalis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 148 *Corynebacterium diphtheriae* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 520 *Corynebacterium diphtheriae* FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 1792 *Corynebacterium diphtheriae* PROBABLE FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 4039 *Bordetella pertussis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 5975 *Bordetella bronchiseptica* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_23 2902 *Bacillus subtilis* mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_4 6262 *Yersinia pseudotuberculosis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 380 *Yersinia pestis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 3041 *Salmonella typhimurium* amn AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 4112 *Salmonella typhi* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 939 *Salmonella paratyphi* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 4112 *Salmonella enteritidis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 2761 *Salmonella dublin* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 5153 *Pseudomonas aeruginosa* amn AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 1598 *Porphyromonas gingivalis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 5983 *Klebsiella pneumoniae* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 9198 *Klebsiella pneumoniae* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 1933 *Escherichia coli* amn AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 721 *Chlamydia trachomatis* D/UW-3/Cx amn AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 972 *Chlamydia pneumoniae* AR39 CP0972 AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 826 *Chlamydia pneumoniae* CWL029 amn AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 3841 *Bordetella pertussis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_4 8091 *Bordetella bronchiseptica* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_9 7233 *Yersinia pseudotuberculosis* BS-yrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2060 *Yersinia pestis* BS-yrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 6146 *Vibrio cholerae* El Tor NI6961 ORF03010 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 610 *Ureaplasma urealyticum* UU470 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 315 *Treponema pallidum* TP0170 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 57 *Streptococcus pyogenes* pfs 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1569 *Streptococcus pneumoniae* BS-yrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1573 *Streptococcus mutans* BS-yrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 577 *Streptococcus equi* BS-yrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)

3_2_2_9 2474 *Staphylococcus aureus* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1497 *Salmonella typhimurium* pfs 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1961 *Salmonella typhi* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 3928 *Salmonella paratyphi* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 3929 *Salmonella paratyphi* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 292 *Porphyromonas gingivalis* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 183 *Pasteurella multocida* pfs 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1427 *Neisseria gonorrhoeae* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 568 *Mycobacterium tuberculosis* Rv0091 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 3505 *Mycobacterium bovis* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2913 *Klebsiella pneumoniae* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1046 *Helicobacter pylori* HP0089 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 83 *Helicobacter pylori* J99sp|Q9ZMY2 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2595 *Haemophilus influenzae* HI1216 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1246 *Haemophilus ducreyi* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 4358 *Escherichia coli* pfs 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 970 *Enterococcus faecium* (DOE) 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1830 *Enterococcus faecalis* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2791 *Enterococcus faecalis* BS-*yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 3687 *Clostridium difficile* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2795 *Clostridium acetobutylicum* 9878262_F1_4 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 784 *Campylobacter jejuni* pfs 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 167 *Borrelia burgdorferi* BB0588 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 373 *Borrelia burgdorferi* BB0375 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 1179 *Borrelia burgdorferi* BBI06 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_2_2_9 2720 *Bacillus subtilis* *yrpU* 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_3_2_1 4626 *Vibrio cholerae* El Tor N16961 ORF01033 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 653 *Streptococcus pneumoniae* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3222 *Staphylococcus aureus* EC-*yecD* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3233 *Salmonella typhimurium* entG ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 4104 *Salmonella typhimurium* *yecD* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3580 *Salmonella typhi* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 4432 *Salmonella typhi* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 931 *Salmonella paratyphi* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 932 *Salmonella paratyphi* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3526 *Salmonella enteritidis* ISOCHORISMATASE (EC 3_3_2_1)

3_3_2_1 3965 *Salmonella enteritidis* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 968 *Salmonella dublin* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2336 *Pseudomonas aeruginosa* PA3953 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 4107 *Pseudomonas aeruginosa* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 5525 *Pseudomonas aeruginosa* PA3066 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 6906 *Pseudomonas aeruginosa* PA3783 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 7491 *Pseudomonas aeruginosa* PA1677 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 8642 *Pseudomonas aeruginosa* PA5507 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2357 *Klebsiella pneumoniae* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 4366 *Klebsiella pneumoniae* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 7168 *Klebsiella pneumoniae* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 9085 *Klebsiella pneumoniae* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 576 *Escherichia coli* entB ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1824 *Escherichia coli* yecD ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 4731 *Escherichia coli* b1011 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1983 *Enterococcus faecium* (DOE) ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2857 *Enterococcus faecium* (DOE) ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3848 *Enterococcus faecium* (DOE) ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2643 *Enterococcus faecalis* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1077 *Clostridium difficile* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1628 *Clostridium difficile* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1629 *Clostridium difficile* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 99 *Clostridium acetobutylicum* 19689005_C1_121 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 329 *Clostridium acetobutylicum* 26601580_F3_58 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 404 *Clostridium acetobutylicum* 26460885_F3_56 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2740 *Campylobacter jejuni* Cj0119 ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 605 *Bordetella pertussis* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 1611 *Bordetella pertussis* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 8300 *Bordetella bronchiseptica* ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 17 *Bacillus subtilis* yaal ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 507 *Bacillus subtilis* yddQ ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 2668 *Bacillus subtilis* yrdC ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3192 *Bacillus subtilis* dhhB ISOCHORISMATASE (EC 3_3_2_1)
 3_3_2_1 3644 *Bacillus subtilis* ywoC ISOCHORISMATASE (EC 3_3_2_1)
 3_4_11_10 7319 *Vibrio cholerae* El Tor N16961ORFA00535 BACTERIAL LEUCYL AMINOPEPTIDASE
 PRECURSOR (EC 3_4_11_10)
 3_4_11_10 2220 *Escherichia coli* b2271 BACTERIAL LEUCYL AMINOPEPTIDASE PRECURSOR (EC
 3_4_11_10)
 3_4_11_12 256 *Bordetella pertussis* AMINOPEPTIDASE II (EC 3_4_11_12)
 3_4_11_12 9074 *Bordetella bronchiseptica* AMINOPEPTIDASE II (EC 3_4_11_12)
 3_4_11_19 7020 *Pseudomonas aeruginosa* PA1486 D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_11_19 1569 *Bordetella pertussis* D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_11_19 1570 *Bordetella pertussis* D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_11_19 4227 *Bordetella pertussis* D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_11_19 5512 *Bordetella bronchiseptica* D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_11_19 9756 *Bordetella bronchiseptica* D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_14_11 298 *Streptococcus pyogenes* pepXP XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_14_11 845 *Streptococcus pneumoniae* XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_14_11 210 *Streptococcus mutans* EC-thyA XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_14_11 605 *Streptococcus mutans* XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_14_11 875 *Streptococcus equi* XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_15_5 354 *Salmonella typhimurium* dcp PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 947 *Salmonella typhi* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 4125 *Salmonella paratyphi* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 4126 *Salmonella paratyphi* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 2731 *Salmonella enteritidis* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 2896 *Salmonella dublin* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 535 *Porphyromonas gingivalis* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 696 *Porphyromonas gingivalis* EC-prIC PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 6742 *Klebsiella pneumoniae* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 6743 *Klebsiella pneumoniae* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_15_5 4973 *Escherichia coli* dcp PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)

3_4_15_5 1136 *Corynebacterium diphtheriae* PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_16_4 5028 *Yersinia pseudotuberculosis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 6013 *Yersinia pseudotuberculosis* EC-dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 7034 *Yersinia pseudotuberculosis* EC-dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1331 *Yersinia pestis* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1911 *Yersinia pestis* EC-dacB PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 4445 *Yersinia pestis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 5215 *Yersinia pestis* EC-dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 4491 *Vibrio cholerae* El Tor N16961 ORF00860 PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 4781 *Vibrio cholerae* El Tor N16961 ORF01253 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 6785 *Vibrio cholerae* El Tor N16961 ORF01229 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 272 *Treponema pallidum* TP0221 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 451 *Treponema pallidum* TP0800 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 376 *Streptococcus pyogenes* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 590 *Streptococcus pyogenes* dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 693 *Streptococcus pyogenes* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 939 *Streptococcus pyogenes* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 246 *Streptococcus pneumoniae* BS-yodJ D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 828 *Streptococcus pneumoniae* BS-dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 333 *Streptococcus mutans* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 83 *Streptococcus equi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 113 *Streptococcus equi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 141 *Staphylococcus aureus* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 30 *Salmonella typhimurium* dacC PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 677 *Salmonella typhimurium* phsF D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2989 *Salmonella typhimurium* yfeW D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3382 *Salmonella typhimurium* dacA PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 3590 *Salmonella typhimurium* dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 572 *Salmonella typhi* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 3007 *Salmonella typhi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3329 *Salmonella typhi* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 3607 *Salmonella typhi* PENICILLIN-BINDING PROTEIN 6B PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4)
 3_4_16_4 3608 *Salmonella typhi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 4279 *Salmonella typhi* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 1337 *Salmonella paratyphi* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1338 *Salmonella paratyphi* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1841 *Salmonella paratyphi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3185 *Salmonella paratyphi* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)

3_4_16_4 3484 *Salmonella paratyphi* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 5542 *Salmonella paratyphi* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1339 *Salmonella enteritidis* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 1972 *Salmonella enteritidis* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 2578 *Salmonella enteritidis* PENICILLIN-BINDING PROTEIN 6B PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4)
 3_4_16_4 2853 *Salmonella enteritidis* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 3440 *Salmonella dublin* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 253 *Rickettsia prowazekii* RP259 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 380 *Rickettsia prowazekii* RP389 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2341 *Pseudomonas aeruginosa* dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 7762 *Pseudomonas aeruginosa* PA3047 PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 132 *Porphyromonas gingivalis* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1375 *Porphyromonas gingivalis* PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 845 *Pasteurella multocida* dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1201 *Pasteurella multocida* dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 478 *Neisseria gonorrhoeae* EC-dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 672 *Neisseria gonorrhoeae* BS-dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 635 *Mycobacterium tuberculosis* dacB D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1382 *Mycobacterium tuberculosis* Rv1922 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 1455 *Mycobacterium tuberculosis* lpqK D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 1643 *Mycobacterium tuberculosis* Rv3627c PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 6012 *Mycobacterium tuberculosis* Rv3330 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2278 *Mycobacterium leprae* O69539 PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 3092 *Mycobacterium leprae* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 683 *Mycobacterium bovis* PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 2199 *Mycobacterium bovis* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3733 *Mycobacterium bovis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 3926 *Mycobacterium bovis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 4089 *Klebsiella pneumoniae* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)

3_4_16_4 4912 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 4913 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 7017 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 7018 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 7779 *Klebsiella pneumoniae* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 8316 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 8317 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 8318 *Klebsiella pneumoniae* PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 14579 *Haemophilus influenzae* HI0029 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 15453 *Haemophilus influenzae* HI1330 PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 536 *Haemophilus ducreyi* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 537 *Haemophilus ducreyi* EC-dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1213 *Haemophilus ducreyi* EC-dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 806 *Escherichia coli* dacC PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 2370 *Escherichia coli* b2430 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3104 *Escherichia coli* dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 4559 *Escherichia coli* dacA PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 5215 *Escherichia coli* yeeC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 206 *Enterococcus faecium* (DOE) D-ALANYL-D-ALANINE CARBOXYPEPTIDASE PRECURSOR (EC 3_4_16_4)
 3_4_16_4 836 *Enterococcus faecalis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2411 *Enterococcus faecalis* BS-yodJ D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 578 *Corynebacterium diphtheriae* PENICILLIN-BINDING PROTEIN 5* PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4)
 3_4_16_4 730 *Corynebacterium diphtheriae* PENICILLIN-BINDING PROTEIN 4 PRECURSOR (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 770 *Clostridium difficile* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1408 *Clostridium difficile* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2162 *Clostridium difficile* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2643 *Clostridium difficile* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3354 *Clostridium difficile* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3637 *Clostridium difficile* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1052 *Clostridium acetobutylicum* 24415892_F1_I D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2545 *Clostridium acetobutylicum* 5135892_C1_23 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2551 *Clostridium acetobutylicum* 34179702_C2_26 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2575 *Clostridium acetobutylicum* 4502338_F2_I0 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3234 *Clostridium acetobutylicum* 32228131_F2_4 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)

3_4_16_4 3977 *Clostridium acetobutylicum* 24415892_F3_2 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 525 *Chlamydia trachomatis* D/UW-3/Cx dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 75 *Chlamydia pneumoniae* AR39 CP0075 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 618 *Chlamydia pneumoniae* CWL029 dacF D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 152 *Borrelia burgdorferi* BB0605 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 176 *Borrelia burgdorferi* BB0582 D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 3486 *Bordetella pertussis* PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE
 3_4_16_4 3564 *Bordetella pertussis* EC-dacC D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 5955 *Bordetella bronchiseptica* EC-dacB PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE
 3_4_16_4 6267 *Bordetella bronchiseptica* EC-dacC PENICILLIN-BINDING PROTEIN 6 PRECURSOR (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE FRACTION C) (EC 3_4_16_4)
 3_4_16_4 10 *Bacillus subtilis* dacA D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 167 *Bacillus subtilis* ybbE D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 1834 *Bacillus subtilis* pbp PENICILLIN-BINDING PROTEIN 4 (PBP-4) (D-ALANYL-D-ALANINE CARBOXYPEPTIDASE) (EC 3_4_16_4) / D-ALANYL-D-ALANINE-ENDOPEPTIDASE (EC 3_4_99_-)
 3_4_16_4 1959 *Bacillus subtilis* yodJ D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2315 *Bacillus subtilis* dacB D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_4 2344 *Bacillus subtilis* dacF D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_6 1841 *Saccharomyces cerevisiae* KEX1 CARBOXYPEPTIDASE KEX1 PRECURSOR (EC 3_4_16_6)
 3_4_17_11 2633 *Pseudomonas aeruginosa* cpg2 CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_11 44 *Pasteurella multocida* CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_11 1107 *Clostridium difficile* CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_11 3394 *Bordetella pertussis* CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_11 6868 *Bordetella bronchiseptica* CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_19 6941 *Yersinia pseudotuberculosis* BS-ypwA THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 1719 *Yersinia pestis* BS-ypwA THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 5237 *Vibrio cholerae* El Tor N16961 ORF01817 THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 177 *Rickettsia prowazekii* RP181 THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 178 *Rickettsia prowazekii* THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 6114 *Klebsiella pneumoniae* THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 1332 *Enterococcus faecium* (DOE) THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 2586 *Enterococcus faecalis* BS-ypwA THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_19 2205 *Bacillus subtilis* ypwA THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_4 2244 *Saccharomyces cerevisiae* CPS1 CARBOXYPEPTIDASE S PRECURSOR (EC 3_4_17_4)
 3_4_19_3 5540 *Yersinia pseudotuberculosis* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 6 *Yersinia pestis* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 535 *Streptococcus pyogenes* sp|Q01328 PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 379 *Streptococcus pneumoniae* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 1655 *Streptococcus pneumoniae* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 2131 *Staphylococcus aureus* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 3429 *Mycobacterium tuberculosis* pcp PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 3509 *Klebsiella pneumoniae* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 806 *Enterococcus faecium* (DOE) PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 1326 *Enterococcus faecalis* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 2747 *Enterococcus faecalis* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 2587 *Clostridium difficile* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_3 266 *Bacillus subtilis* pcp PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)
 3_4_19_5 3689 *Salmonella typhimurium* iadA ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_19_5 2530 *Salmonella typhi* ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_19_5 816 *Salmonella paratyphi* ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_19_5 817 *Salmonella paratyphi* ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_19_5 3717 *Salmonella enteritidis* ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_19_5 6439 *Escherichia coli* iadA ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)

3_4_21_48 2655 *Saccharomyces cerevisiae* PRB1 CEREVISIN PRECURSOR (EC 3_4_21_48)
 3_4_21_48 2744 *Saccharomyces cerevisiae* YCR045C CEREVISIN (EC 3_4_21_48)
 3_4_21_50 3933 *Pseudomonas aeruginosa* PA4175 PROTEASE I PRECURSOR (EC 3_4_21_50)
 3_4_21_50 1346 *Porphyromonas gingivalis* PROTEASE I PRECURSOR (EC 3_4_21_50)
 3_4_21_61 2851 *Saccharomyces cerevisiae* KEX2 KEXIN PRECURSOR (EC 3_4_21_61)
 3_4_21_62 1030 *Bacillus subtilis* aprE SUBTILISIN E PRECURSOR (EC 3_4_21_62)
 3_4_21_72 1680 *Neisseria gonorrhoeae* IMMUNOGLOBULIN A1 PROTEASE (EC 3_4_21_72)
 3_4_21_72 16173 *Haemophilus influenzae* HI0990 IMMUNOGLOBULIN A1 PROTEASE (EC 3_4_21_72)
 3_4_21_87 4520 *Escherichia coli* ompT PROTEASE VII PRECURSOR (EC 3_4_21_87)
 3_4_21_88 6837 *Yersinia pseudotuberculosis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 2332 *Yersinia pestis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 3976 *Vibrio cholerae* El Tor N16961 ORF00139 LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1634 *Staphylococcus aureus* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 568 *Salmonella typhimurium* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 5586 *Salmonella typhi* LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 5357 *Salmonella paratyphi* LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 2199 *Salmonella dublin* LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 6347 *Pseudomonas aeruginosa* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1874 *Pasteurella multocida* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1489 *Mycobacterium tuberculosis* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1314 *Mycobacterium leprae*trjQ49848 LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 808 *Mycobacterium bovis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 8474 *Klebsiella pneumoniae* LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1665 *Haemophilus influenzae* HI0749 LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 177 *Haemophilus ducreyi* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 3929 *Escherichia coli* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 2502 *Enterococcus faecalis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 169 *Corynebacterium diphtheriae* LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 3623 *Clostridium difficile* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 2378 *Clostridium acetobutylicum* I9720265_F1_1 LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 2069 *Bordetella pertussis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 5119 *Bordetella bronchiseptica* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_21_88 1785 *Bacillus subtilis* lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_22_37 1707 *Porphyromonas gingivalis*trjO33441 ARGININE-SPECIFIC CYSTEINE PROTEINASE RGP-2 (EC 3_4_22_37)
 3_4_23_23 20437 *Neurospora crassa* MUCOROPEPSIN PRECURSOR (EC 3_4_23_23)
 3_4_23_25 1788 *Saccharomyces cerevisiae* PEP4 SACCHAROPEPSIN PRECURSOR (EC 3_4_23_25)
 3_4_23_35 4561 *Saccharomyces cerevisiae* BARI BARRIERPEPSIN PRECURSOR (EC 3_4_23_35)
 3_4_23_36 8054 *Yersinia pseudotuberculosis* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 68 *Yersinia pestis* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 4541 *Vibrio cholerae* El Tor N16961 ORF00923 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 742 *Treponema pallidum* TP0978 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 165 *Streptococcus pyogenes* lsp LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 465 *Streptococcus pneumoniae* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1294 *Streptococcus mutans* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 266 *Staphylococcus aureus* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 3431 *Salmonella typhimurium* lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1723 *Salmonella typhi* LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 745 *Salmonella paratyphi* LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 3345 *Salmonella dublin* LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 399 *Rickettsia prowazekii* RP408 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 4625 *Pseudomonas aeruginosa* lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1807 *Porphyromonas gingivalis* LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 765 *Pasteurella multocida* lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 851 *Neisseria gonorrhoeae* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 543 *Mycoplasma pneumoniae* MP543 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 3712 *Mycoplasma genitalium* MG210 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1180 *Mycobacterium tuberculosis* lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1591 *Mycobacterium leprae*trjQ9X7E7 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1598 *Mycobacterium bovis* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1883 *Klebsiella pneumoniae*trjQ9RF47 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)

3_4_23_36 1033 *Helicobacter pylori* HP0074 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 70 *Helicobacter pylori* J99sp|Q9ZM23 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 9403 *Haemophilus influenzae* HI1006 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1287 *Haemophilus ducreyi* EC-IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 27 *Escherichia coli* IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1032 *Enterococcus faecalis* EC-IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1695 *Corynebacterium diphtheriae* LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 158 *Clostridium difficile* EC-IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 2797 *Clostridium acetobutylicum* 203451_F2_9 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 844 *Chlamydia trachomatis* D/UW-3/Cx IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 217 *Chlamydia pneumoniae* AR39 CP0217 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 487 *Chlamydia pneumoniae* CWL029 IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 2773 *Campylobacter jejuni* IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 829 *Borrelia burgdorferi* BB0469 LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 977 *Bordetella pertussis* EC-IspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_23_36 1546 *Bacillus subtilis* Isp LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_24_25 7371 *Vibrio cholerae* El Tor N16961ORFA00596 NEUTRAL PROTEASE PRECURSOR (EC 3_4_24_25)
 3_4_24_26 7085 *Pseudomonas aeruginosa* lasB PSEUDOLYSIN PRECURSOR (EC 3_4_24_26)
 3_4_24_28 1628 *Enterococcus faecalis* BACILLOLYSIN PRECURSOR (EC 3_4_24_28)
 3_4_24_28 3569 *Clostridium acetobutylicum* 3173412_F3_1 BACILLOLYSIN (EC 3_4_24_28)
 3_4_24_28 3776 *Clostridium acetobutylicum* I64218_C2_3 BACILLOLYSIN (EC 3_4_24_28)
 3_4_24_28 1110 *Bacillus subtilis* nprB BACILLOLYSIN PRECURSOR (EC 3_4_24_28)
 3_4_24_28 1471 *Bacillus subtilis* nprE BACILLOLYSIN PRECURSOR (EC 3_4_24_28)
 3_4_24_3 244 *Streptococcus pyogenes* BS-ymN COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 468 *Streptococcus pneumoniae* COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 1298 *Streptococcus pneumoniae* BS-ymN COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 720 *Streptococcus mutans* BS-ymN COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 661 *Streptococcus equi* BS-ymN COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 3301 *Staphylococcus aureus* BS-ymN COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 5197 *Salmonella paratyphi* COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 5200 *Salmonella paratyphi* COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 107 *Porphyromonas gingivalis* BS-ymO COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 2365 *Enterococcus faecium* (DOE) COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 1709 *Enterococcus faecalis* COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 2894 *Enterococcus faecalis* COLLAGENASE (EC 3_4_24_3)
 3_4_24_3 2728 *Bacillus subtilis* ymrN COLLAGENASE (EC 3_4_24_3)
 3_4_24_36 20058 *Neurospora crassa* LEISHMANOLYSIN PRECURSOR (EC 3_4_24_36)
 3_4_24_37 4431 *Saccharomyces cerevisiae* PRD1 SACCHAROLYSIN (EC 3_4_24_37)
 3_4_24_55 4959 *Yersinia pseudotuberculosis* BS-ymfH PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3122 *Yersinia pestis* BS-ymfH PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3714 *Yersinia pestis* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 4988 *Salmonella typhimurium* ptr PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3281 *Salmonella typhi* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3680 *Salmonella paratyphi* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3681 *Salmonella paratyphi* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 3682 *Salmonella paratyphi* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 2304 *Salmonella enteritidis* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 2182 *Klebsiella pneumoniae* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 2183 *Klebsiella pneumoniae* PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 1373 *Haemophilus ducreyi* BS-ymfH PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_55 6513 *Escherichia coli* ptr PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_57 4630 *Yersinia pseudotuberculosis* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 6104 *Yersinia pseudotuberculosis* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 495 *Yersinia pestis* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 3508 *Yersinia pestis* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 5784 *Vibrio cholerae* El Tor N16961 ORF02509 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 448 *Ureaplasma urealyticum* UU312 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 555 *Ureaplasma urealyticum* UU411 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)

3_4_24_57 554 *Treponema pallidum* TP0680 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 655 *Treponema pallidum* TP0876 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 519 *Streptococcus pyogenes* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 521 *Streptococcus pyogenes* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 561 *Streptococcus pneumoniae* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 563 *Streptococcus pneumoniae* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1362 *Streptococcus mutans* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1364 *Streptococcus mutans* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 382 *Streptococcus equi* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 383 *Streptococcus equi* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1432 *Staphylococcus aureus* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2188 *Staphylococcus aureus* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2009 *Salmonella typhimurium* gcp O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2436 *Salmonella typhimurium* yeaZ O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2056 *Salmonella typhi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 5350 *Salmonella typhi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2139 *Salmonella paratyphi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2140 *Salmonella paratyphi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2142 *Salmonella paratyphi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 4675 *Salmonella paratyphi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 4676 *Salmonella paratyphi* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 3307 *Salmonella enteritidis* PROBABLE O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2408 *Saccharomyces cerevisiae* QRI7 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 3450 *Saccharomyces cerevisiae* YKR038C O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 7984 *Saccharomyces cerevisiae* YGR262C O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 35 *Rickettsia prowazekii* RP037 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 534 *Rickettsia prowazekii* RP551 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 3917 *Pseudomonas aeruginosa* gcp O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 6251 *Pseudomonas aeruginosa* PA3685 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 852 *Porphyromonas gingivalis* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1134 *Porphyromonas gingivalis* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 838 *Pasteurella multocida* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 882 *Pasteurella multocida* gcp O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 474 *Neisseria gonorrhoeae* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1488 *Neisseria gonorrhoeae* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 96 *Mycoplasma pneumoniae* MP095 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 95 *Mycoplasma genitalium* MG046 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1317 *Mycobacterium tuberculosis* Rv3421c O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1319 *Mycobacterium tuberculosis* gcp O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2115 *Mycobacterium leprae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2843 *Mycobacterium leprae* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2285 *Mycobacterium bovis* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1586 *Klebsiella pneumoniae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1587 *Klebsiella pneumoniae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1588 *Klebsiella pneumoniae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)

3_4_24_57 962 *Helicobacter pylori* HP1584 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1480 *Helicobacter pylori* J99 ydiE PROBABLE O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 8065 *Haemophilus influenzae* HI0388 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 20806 *Haemophilus influenzae* HI0530 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 742 *Haemophilus ducreyi* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 957 *Haemophilus ducreyi* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 5111 *Escherichia coli* b1807 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 5814 *Escherichia coli* ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2779 *Enterococcus faecium* (DOE) O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2784 *Enterococcus faecium* (DOE) O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1349 *Enterococcus faecalis* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1352 *Enterococcus faecalis* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 289 *Corynebacterium diphtheriae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 431 *Corynebacterium diphtheriae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 432 *Corynebacterium diphtheriae* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2379 *Clostridium difficile* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 2381 *Clostridium difficile* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1285 *Clostridium acetobutylicum* 2931513_F2_23 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 3744 *Clostridium acetobutylicum* 26361327_C2_7 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 187 *Chlamydia trachomatis* D/UW-3/Cx EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 327 *Chlamydia trachomatis* D/UW-3/Cx CT343 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 573 *Chlamydia pneumoniae* AR39 CP0573 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 746 *Chlamydia pneumoniae* AR39 CP0746 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 31 *Chlamydia pneumoniae* CWL029 gcp_1 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 177 *Chlamydia pneumoniae* CWL029 EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 309 *Campylobacter jejuni* Cj1344c O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1 *Borrelia burgdorferi* BB0769 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 555 *Borrelia burgdorferi* BB0185 O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 1527 *Bordetella pertussis* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 4501 *Bordetella pertussis* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 7659 *Bordetella bronchiseptica* BS-ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 8334 *Bordetella bronchiseptica* EC-ygiD O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 592 *Bacillus subtilis* ydiC O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_57 594 *Bacillus subtilis* ydiE O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_70 7926 *Yersinia pseudotuberculosis* EC-prlC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 2026 *Yersinia pestis* EC-prlC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 4071 *Vibrio cholerae* El Tor N16961 ORF00269 OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 649 *Salmonella typhimurium* optA OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 764 *Salmonella paratyphi* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 2014 *Salmonella paratyphi* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 3919 *Salmonella enteritidis* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 4110 *Salmonella dublin* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 2464 *Pseudomonas aeruginosa* prlC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 1615 *Pasteurella multocida* prlC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 887 *Neisseria gonorrhoeae* EC-prlC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 6174 *Klebsiella pneumoniae* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 6175 *Klebsiella pneumoniae* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 6176 *Klebsiella pneumoniae* OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 4121 *Haemophilus influenzae* HI0214 OLIGOPEPTIDASE A (EC 3_4_24_70)

3_4_24_70 375 *Haemophilus ducreyi* EC-prIC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 6046 *Escherichia coli* prIC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 2395 *Bordetella pertussis* EC-prIC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_70 6751 *Bordetella bronchiseptica* EC-prIC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_75 3190 *Staphylococcus aureus* LYSOSTAPHIN PRECURSOR (EC 3_4_24_75)
 3_5_1_1 4155 *Yersinia pseudotuberculosis* EC-ansB L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 6995 *Yersinia pseudotuberculosis* EC-ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 72 *Yersinia pestis* EC-ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2531 *Yersinia pestis* EC-ansB L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 5790 *Vibrio cholerae* El Tor N16961 ORF02519 L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 6352 *Vibrio cholerae* El Tor N16961 ORF03292 L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 788 *Streptococcus pyogenes* ansB L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 279 *Streptococcus pneumoniae* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 280 *Streptococcus pneumoniae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1253 *Streptococcus mutans* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1573 *Streptococcus equi* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1526 *Staphylococcus aureus* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2558 *Salmonella typhimurium* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2595 *Salmonella typhimurium* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 3025 *Salmonella typhimurium* ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 6472 *Salmonella typhimurium* ybiK L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1134 *Salmonella typhi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2240 *Salmonella typhi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2815 *Salmonella typhi* L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 249 *Salmonella paratyphi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 604 *Salmonella paratyphi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 605 *Salmonella paratyphi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1962 *Salmonella paratyphi* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1963 *Salmonella paratyphi* L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 1405 *Salmonella enteritidis* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2927 *Salmonella enteritidis* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 4232 *Salmonella enteritidis* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 4972 *Salmonella enteritidis* PUTATIVE L-ASPARAGINASE PRECURSOR (EC 3_5_1_1)
 3_5_1_1 943 *Salmonella dublin* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1090 *Salmonella dublin* PUTATIVE L-ASPARAGINASE PRECURSOR (EC 3_5_1_1)
 3_5_1_1 1293 *Salmonella dublin* L-ASPARAGINASE I (EC 3_5_1_1)
 3_5_1_1 3442 *Salmonella dublin* L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_1 2791 *Saccharomyces cerevisiae* ASPI L-ASPARAGINASE I (EC 3_5_1_1)
 3_5_1_1 81 *Pseudomonas aeruginosa* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 823 *Porphyromonas gingivalis* EC-ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 299 *Neisseria gonorrhoeae* EC-ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 3679 *Mycobacterium tuberculosis* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1592 *Mycobacterium leprae* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1597 *Mycobacterium bovis* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2804 *Klebsiella pneumoniae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2805 *Klebsiella pneumoniae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2806 *Klebsiella pneumoniae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 7348 *Klebsiella pneumoniae* L-ASPARAGINASE PRECURSOR (EC 3_5_1_1)
 3_5_1_1 7349 *Klebsiella pneumoniae* L-ASPARAGINASE PRECURSOR (EC 3_5_1_1)
 3_5_1_1 8179 *Klebsiella pneumoniae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 151 *Helicobacter pylori* HP0723 L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 661 *Helicobacter pylori* J99sp/Q9ZLB9 L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 891 *Haemophilus influenzae* HI0745 L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 820 *Haemophilus ducreyi* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 795 *Escherichia coli* ybiK L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1724 *Escherichia coli* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 5750 *Escherichia coli* ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2596 *Enterococcus faecalis* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 140 *Corynebacterium diphtheriae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1698 *Corynebacterium diphtheriae* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 563 *Clostridium difficile* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2965 *Clostridium acetobutylicum* 6635_C3_20 L-ASPARAGINASE (EC 3_5_1_1)

3_5_1_1 1148 *Campylobacter jejuni* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1207 *Bordetella pertussis* L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 1208 *Bordetella pertussis* EC-ansB L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 4250 *Bordetella pertussis* EC-ybiK L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 8415 *Bordetella bronchiseptica* EC-ybiK L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 270 *Bacillus subtilis* yccC L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_1 2354 *Bacillus subtilis* ansA L-ASPARAGINASE (EC 3_5_1_1)
 3_5_1_10 4326 *Yersinia pseudotuberculosis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 149 *Yersinia pestis* EC-purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 3791 *Yersinia pestis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 5787 *Vibrio cholerae* El Tor N16961 ORF02513 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 3439 *Salmonella typhimurium* tgs FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 5199 *Salmonella typhimurium* yceP FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 356 *Salmonella typhi* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 4138 *Salmonella typhi* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 501 *Salmonella paratyphi* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1526 *Salmonella paratyphi* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 824 *Salmonella enteritidis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1285 *Salmonella enteritidis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1059 *Salmonella dublin* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 2512 *Salmonella dublin* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 5003 *Pseudomonas aeruginosa* purU2 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 8224 *Pseudomonas aeruginosa* purU1 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1694 *Pasteurella multocida* purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 813 *Mycobacterium tuberculosis* purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 3528 *Mycobacterium bovis* EC-purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1896 *Klebsiella pneumoniae* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 7137 *Klebsiella pneumoniae* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 819 *Helicobacter pylori* HP1434 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1157 *Helicobacter pylori* J99sp|Q9ZJY0 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1315 *Helicobacter pylori* J99tr|Q9ZJ12 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 3271 *Haemophilus influenzae* HI1588 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 4753 *Escherichia coli* b1060 FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 4825 *Escherichia coli* purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 2 *Campylobacter jejuni* Cj0630c FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1323 *Campylobacter jejuni* purU FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 3297 *Bordetella pertussis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 8257 *Bordetella bronchiseptica* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_10 1312 *Bacillus subtilis* ykkE FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_11 2811 *Staphylococcus aureus* BS-yxeI PENICILLIN ACYLASE (EC 3_5_1_11)
 3_5_1_11 1770 *Pseudomonas aeruginosa* PA0305 PENICILLIN ACYLASE II PRECURSOR (EC 3_5_1_11)
 3_5_1_11 6244 *Pseudomonas aeruginosa* PA1893 PENICILLIN ACYLASE (EC 3_5_1_11)
 3_5_1_16 4279 *Yersinia pseudotuberculosis* EC-argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 1386 *Yersinia pestis* EC-argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 6394 *Vibrio cholerae* El Tor N16961 ORF03344 ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 5227 *Salmonella typhimurium* argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 1720 *Salmonella typhi* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 2419 *Salmonella paratyphi* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 2420 *Salmonella paratyphi* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 2421 *Salmonella paratyphi* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)

3_5_1_16 3603 *Salmonella enteritidis* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 1736 *Salmonella dublin* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 3491 *Pseudomonas aeruginosa* PA5390 ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 7615 *Pseudomonas aeruginosa* argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 551 *Pasteurella multocida* argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 900 *Klebsiella pneumoniae* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 901 *Klebsiella pneumoniae* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 7476 *Klebsiella pneumoniae* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 191 *Haemophilus ducreyi* EC-argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 2796 *Escherichia coli* b2872 ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 6268 *Escherichia coli* argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 688 *Enterococcus faecalis* BS-ylmB ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 296 *Clostridium difficile* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 447 *Clostridium difficile* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 60 *Bordetella pertussis* gi|39742 ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 2779 *Bordetella pertussis* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 5881 *Bordetella bronchiseptica* ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_16 1968 *Bacillus subtilis* argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_18 7425 *Yersinia pseudotuberculosis* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1511 *Yersinia pestis* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 5939 *Vibrio cholerae* El Tor N16961 ORF02722 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1416 *Streptococcus pneumoniae* BS-ytjP SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 965 *Streptococcus mutans* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1925 *Staphylococcus aureus* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 3493 *Salmonella typhimurium* msgB SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 36 *Salmonella typhi* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 4025 *Salmonella paratyphi* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 4026 *Salmonella paratyphi* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 4027 *Salmonella paratyphi* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1028 *Salmonella dublin* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 844 *Rickettsia prowazekii* RP874 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 3960 *Pseudomonas aeruginosa* dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1781 *Pasteurella multocida* dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 249 *Neisseria gonorrhoeae* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 5088 *Mycobacterium tuberculosis* dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1113 *Mycobacterium leprae* EC-argE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 2119 *Mycobacterium bovis* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 6503 *Klebsiella pneumoniae* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1161 *Helicobacter pylori* HP0212 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 202 *Helicobacter pylori* J99tr|Q9ZMM0 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 14433 *Haemophilus influenzae* HI0102 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1491 *Haemophilus ducreyi* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 2412 *Escherichia coli* dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1211 *Enterococcus faecium* (DOE) SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 2335 *Enterococcus faecalis* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)

3_5_1_18 2590 *Enterococcus faecalis* BS-ytp SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1422 *Corynebacterium diphtheriae* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 2127 *Clostridium difficile* SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 546 *Clostridium acetobutylicum* 975937_C2_76 SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 1711 *Campylobacter jejuni* dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 822 *Bordetella pertussis* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 5336 *Bordetella bronchiseptica* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_18 2992 *Bacillus subtilis* ytp SUCCINYL-DIAMINOPIMELATE DESUCCINYLASE (EC 3_5_1_18)
 3_5_1_19 5821 *Yersinia pseudotuberculosis* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 73 *Yersinia pestis* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 7218 *Vibrio cholerae* El Tor N16961ORFA00407 PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 539 *Treponema pallidum* TP0696 NICOTINAMIDASE (EC 3_5_1_19)
 3_5_1_19 2596 *Salmonella typhimurium* nam PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 1133 *Salmonella typhi* PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 607 *Salmonella paratyphi* PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 8451 *Saccharomyces cerevisiae* PNC1 PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 7913 *Pseudomonas aeruginosa* PA4918 PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 1093 *Porphyromonas gingivalis* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 1804 *Neisseria gonorrhoeae* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 3702 *Mycobacterium tuberculosis* pncA PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 3436 *Mycobacterium bovis* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 2803 *Klebsiella pneumoniae* PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 1725 *Escherichia coli* ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 1057 *Borrelia burgdorferi* BBE22 PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 3853 *Bordetella pertussis* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_19 8728 *Bordetella bronchiseptica* EC-ydjB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_-) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_23 933 *Pseudomonas aeruginosa* PA0845 ALKALINE CERAMIDASE (EC 3_5_1_23)
 3_5_1_23 4779 *Mycobacterium tuberculosis* Rv0669c ALKALINE CERAMIDASE (EC 3_5_1_23)
 3_5_1_23 3244 *Mycobacterium bovis* ALKALINE CERAMIDASE (EC 3_5_1_23)
 3_5_1_24 7383 *Vibrio cholerae* El Tor N16961ORFA00610 CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 6541 *Salmonella typhimurium* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 168 *Salmonella typhi* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 1953 *Salmonella enteritidis* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 3991 *Salmonella dublin* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 3614 *Enterococcus faecium* (DOE) CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 852 *Enterococcus faecalis* BS-yxe1 CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 2439 *Enterococcus faecalis* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 1478 *Bordetella pertussis* CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 2223 *Bordetella pertussis* BS-yxe1 CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)

3_5_1_24 7950 *Bordetella bronchiseptica* BS-yxeI CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_24 3947 *Bacillus subtilis* yxeI CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_25 5703 *Yersinia pseudotuberculosis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 7386 *Yersinia pseudotuberculosis* EC-nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 3507 *Yersinia pestis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 4190 *Yersinia pestis* EC-nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 80 *Vibrio cholerae* El Tor N16961 ORF01316 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 5580 *Vibrio cholerae* El Tor N16961 ORF02264 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 71 *Streptococcus pyogenes* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1604 *Staphylococcus aureus* EC-nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 6364 *Salmonella typhimurium* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 4403 *Salmonella typhi* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2395 *Salmonella paratyphi* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2396 *Salmonella paratyphi* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2397 *Salmonella paratyphi* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2398 *Salmonella paratyphi* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 276 *Salmonella enteritidis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1597 *Salmonella dublin* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1641 *Pseudomonas aeruginosa* PA3758 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1695 *Pasteurella multocida* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 6014 *Mycobacterium tuberculosis* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2197 *Mycobacterium bovis* EC-nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 3103 *Klebsiella pneumoniae* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 21597 *Haemophilus influenzae* HI0140 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 410 *Haemophilus ducreyi* EC-nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 4587 *Escherichia coli* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 331 *Enterococcus faecium* (DOE) N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1926 *Enterococcus faecalis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 2202 *Enterococcus faecalis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1841 *Corynebacterium diphtheriae* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 950 *Clostridium difficile* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 1237 *Clostridium difficile* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 504 *Clostridium acetobutylicum* 34274001_F1_6 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)

3_5_1_25 587 *Borrelia burgdorferi* BB0151 N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_25 3496 *Bacillus subtilis* nagA N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_32 20244 *Neurospora crassa* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 759 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 760 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 3135 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 3136 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 3137 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 3138 *Klebsiella pneumoniae* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 2867 *Campylobacter jejuni* hipO HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 657 *Bordetella pertussis* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_32 7214 *Bordetella bronchiseptica* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_33 1494 *Streptococcus pneumoniae* peptidoglycan N-acetylglucosamine deacetylase (EC 3_5_1_33)
 3_5_1_38 725 *Pseudomonas aeruginosa* ansB GLUTAMINASE-ASPARAGINASE (EC 3_5_1_38)
 3_5_1_4 6585 *Saccharomyces cerevisiae* AMD2 AMIDASE (EC 3_5_1_4)
 3_5_1_4 6120 *Pseudomonas aeruginosa* amiE ALIPHATIC AMIDASE (EC 3_5_1_4)
 3_5_1_4 3373 *Mycobacterium leprae* PUTATIVE AMIDASE CY50_19C (EC 3_5_1_4)
 3_5_1_4 3374 *Mycobacterium leprae* PUTATIVE AMIDASE CY50_19C (EC 3_5_1_4)
 3_5_1_4 3411 *Mycobacterium leprae* PUTATIVE AMIDASE CY50_19C (EC 3_5_1_4)
 3_5_1_4 1501 *Mycobacterium bovis* PUTATIVE AMIDASE CY50_19C (EC 3_5_1_4)
 3_5_1_4 1502 *Mycobacterium bovis* PUTATIVE AMIDASE CY50_19C (EC 3_5_1_4)
 3_5_1_4 634 *Helicobacter pylori* HP1238 ALIPHATIC AMIDASE (EC 3_5_1_4)
 3_5_1_4 1241 *Helicobacter pylori* HP0294 ALIPHATIC AMIDASE (EC 3_5_1_4)
 3_5_1_4 283 *Helicobacter pylori* J99tr|Q9ZME1 ALIPHATIC AMIDASE (EC 3_5_1_4)
 3_5_1_4 1149 *Helicobacter pylori* J99tr|Q9ZJY8 ALIPHATIC AMIDASE (EC 3_5_1_4)
 3_5_1_41 2609 *Saccharomyces cerevisiae* CDA1 CHITIN DEACETYLASE 2 (EC 3_5_1_41)
 3_5_1_41 4398 *Saccharomyces cerevisiae* CDA2 CHITIN DEACETYLASE PRECURSOR (EC 3_5_1_41)
 3_5_1_46 423 *Pseudomonas aeruginosa* PA5542 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 8553 *Pseudomonas aeruginosa* PA4347 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 8734 *Pseudomonas aeruginosa* PA2228 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 1251 *Mycobacterium tuberculosis* Rv1723 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 135 *Mycobacterium bovis* 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 3209 *Klebsiella pneumoniae* 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 2333 *Enterococcus faecium* (DOE) 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_46 758 *Clostridium difficile* 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_49 3660 *Bordetella pertussis* FORMAMIDASE (EC 3_5_1_49)
 3_5_1_49 5256 *Bordetella bronchiseptica* FORMAMIDASE (EC 3_5_1_49)
 3_5_1_5 6613 *Yersinia pseudotuberculosis* UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3419 *Yersinia pestis* UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3570 *Yersinia pestis* UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3743 *Yersinia pestis*tr|Q9ZFS0 UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 80 *Ureaplasma urealyticum* UU432 UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 82 *Ureaplasma urealyticum* UU433 UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 108 *Ureaplasma urealyticum* UU434 UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 1234 *Staphylococcus aureus* BS-ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 2422 *Staphylococcus aureus* BS-ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3201 *Staphylococcus aureus* BS-ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4411 *Pseudomonas aeruginosa* ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4412 *Pseudomonas aeruginosa* ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 7688 *Pseudomonas aeruginosa* ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 851 *Mycobacterium tuberculosis* ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 852 *Mycobacterium tuberculosis* ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 853 *Mycobacterium tuberculosis* ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3853 *Mycobacterium bovis* BS-ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3854 *Mycobacterium bovis* BS-ureB UREASE (EC 3_5_1_5)
 3_5_1_5 3856 *Mycobacterium bovis* BS-ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 399 *Klebsiella pneumoniae* UREASE GAMMA SUBUNIT (EC 3_5_1_5)

3_5_1_5 4843 *Klebsiella pneumoniae* UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4844 *Klebsiella pneumoniae* UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 1031 *Helicobacter pylori* HP0072 UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 1032 *Helicobacter pylori* HP0073 UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 68 *Helicobacter pylori* J99 ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 69 *Helicobacter pylori* J99sp|Q9ZMZ4 UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 13527 *Haemophilus influenzae* HI0541 UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 13528 *Haemophilus influenzae* HI0540 UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 20788 *Haemophilus influenzae* HI0539 UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4064 *Bordetella pertussis* BS-ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4065 *Bordetella pertussis* BS-ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 4067 *Bordetella pertussis* BS-ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 21 *Bordetella bronchiseptica* BS-ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 23 *Bordetella bronchiseptica* BS-ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 24 *Bordetella bronchiseptica* BS-ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3659 *Bacillus subtilis* ureC UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3660 *Bacillus subtilis* ureB UREASE BETA SUBUNIT (EC 3_5_1_5)
 3_5_1_5 3661 *Bacillus subtilis* ureA UREASE GAMMA SUBUNIT (EC 3_5_1_5)
 3_5_1_54 4285 *Yersinia pseudotuberculosis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2282 *Yersinia pestis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 7283 *Vibrio cholerae* El Tor N16961ORFA00493 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 7284 *Vibrio cholerae* El Tor N16961ORFA00494 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 922 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 923 *Staphylococcus aureus* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 1360 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 1361 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 5051 *Salmonella typhimurium* ybgK UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 5052 *Salmonella typhimurium* ybgJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3339 *Salmonella typhi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 4842 *Salmonella typhi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3245 *Salmonella paratyphi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3246 *Salmonella paratyphi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3905 *Salmonella dublin* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 6608 *Saccharomyces cerevisiae* DUR1,2 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2353 *Pseudomonas aeruginosa* PA4510 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2354 *Pseudomonas aeruginosa* PA4509 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 4869 *Pseudomonas aeruginosa* PA2110 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 5257 *Pseudomonas aeruginosa* PA0495 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54) / BIOTIN CARBOXYLASE (EC 6_3_4_14)
 3_5_1_54 5258 *Pseudomonas aeruginosa* PA0496 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 8451 *Pseudomonas aeruginosa* PA2111 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)

3_5_1_54 2743 *Mycobacterium tuberculosis* Rv0263c UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2744 *Mycobacterium tuberculosis* Rv0264c UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 421 *Mycobacterium leprae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 422 *Mycobacterium leprae* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3460 *Mycobacterium bovis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 3461 *Mycobacterium bovis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 1735 *Klebsiella pneumoniae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 1737 *Klebsiella pneumoniae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 14660 *Haemophilus influenzae* HI1730 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 18274 *Haemophilus influenzae* HI1731 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 685 *Escherichia coli* b0711 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 686 *Escherichia coli* b0712 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 271 *Clostridium difficile* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 272 *Clostridium difficile* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2019 *Campylobacter jejuni* Cj1542 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 2021 *Campylobacter jejuni* Cj1543 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 4415 *Bordetella pertussis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_54 7189 *Bordetella bronchiseptica* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_59 2726 *Staphylococcus aureus* BS-yaal N-CARBAMOYL SARCOSINE AMIDASE (EC 3_5_1_59)
 3_5_1_68 7027 *Yersinia pseudotuberculosis* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 2539 *Yersinia pestis* Q9ZC73 N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 2279 *Pseudomonas aeruginosa* hutG N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 3150 *Bordetella pertussis* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 3868 *Bordetella pertussis* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 5743 *Bordetella bronchiseptica* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_68 7638 *Bordetella bronchiseptica* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_78 6658 *Salmonella typhimurium* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 3398 *Salmonella typhi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 5497 *Salmonella paratyphi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 5498 *Salmonella paratyphi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 3827 *Salmonella enteritidis* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 4494 *Salmonella dublin* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) (GLUTATHIONE:SPERMIDINE LIGASE [ADP-FORMING]) (GSP SYNTHETASE) ;

GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78) (GLUTATHIONYLSPERMIDINE AMIDOHYDROLASE [SPERMIDINE- FORMING]) (GSP AMIDASE)]
 3_5_1_78 4641 *Klebsiella pneumoniae* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_78 5772 *Escherichia coli* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_80 6605 *Escherichia coli* agaA N-acetylgalactosamine-6-phosphate deacetylase (EC 3_5_1_80)
 3_5_1_81 6947 *Klebsiella pneumoniae* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_81 6948 *Klebsiella pneumoniae* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_81 9294 *Klebsiella pneumoniae* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_81 739 *Clostridium difficile* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_81 1550 *Clostridium difficile* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_82 637 *Mycobacterium tuberculosis* Rv2913c N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_1_82 644 *Mycobacterium bovis* N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_1_82 1495 *Bordetella pertussis* N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_1_82 4613 *Bordetella pertussis* N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_1_82 4787 *Bordetella pertussis* N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_1_82 8553 *Bordetella bronchiseptica* N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_2_10 360 *Mycobacterium tuberculosis* Rv0695 creatininase (EC 3_5_2_10)
 3_5_2_10 3960 *Mycobacterium bovis* creatininase (EC 3_5_2_10)
 3_5_2_10 7968 *Klebsiella pneumoniae* creatininase (EC 3_5_2_10)
 3_5_2_12 903 *Streptococcus pyogenes* amC 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_12 1309 *Streptococcus mutans* 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_12 953 *Streptococcus equi* 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_12 1217 *Enterococcus faecium* (DOE) 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_12 326 *Enterococcus faecalis* 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_12 9625 *Bordetella bronchiseptica* 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_14 4214 *Saccharomyces cerevisiae* YKL215C N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_14 5160 *Mycobacterium tuberculosis* Rv0266c N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_14 3627 *Mycobacterium bovis* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_14 3794 *Bordetella pertussis* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_14 7418 *Bordetella bronchiseptica* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_14 8171 *Bordetella bronchiseptica* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14)
 3_5_2_14 8443 *Bordetella bronchiseptica* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14)
 3_5_2_14 8462 *Bordetella bronchiseptica* N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14)
 3_5_2_5 5495 *Salmonella typhimurium* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 6608 *Salmonella typhimurium* allA ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 3001 *Salmonella typhi* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 5615 *Salmonella paratyphi* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 5616 *Salmonella paratyphi* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 934 *Salmonella enteritidis* PUTATIVE ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 2653 *Salmonella dublin* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 3910 *Saccharomyces cerevisiae* DAL1 ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 1851 *Pseudomonas aeruginosa* PA5541 ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 495 *Escherichia coli* b0512 ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 312 *Enterococcus faecalis* BS-yunH ALLANTOINASE (EC 3_5_2_5)
 3_5_2_5 3236 *Bacillus subtilis* yunH ALLANTOINASE (EC 3_5_2_5)
 3_5_2_6 2373 *Yersinia pestis* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 7549 *Vibrio cholerae* El Tor N16961ORFA00821 BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 336 *Streptococcus equi* BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)

3_5_2_6 6023 *Salmonella typhimurium* METALLO-BETA-LACTAMASE L1 PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 2770 *Salmonella typhi* BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 3634 *Salmonella paratyphi* METALLO-BETA-LACTAMASE L1 PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 4953 *Salmonella enteritidis* METALLO-BETA-LACTAMASE L1 PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 2462 *Salmonella dublin* METALLO-BETA-LACTAMASE L1 PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 1334 *Pseudomonas aeruginosa* ampC BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 4527 *Pseudomonas aeruginosa* PA0057 BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 4808 *Pseudomonas aeruginosa* PA5514 BETA-LACTAMASE OXA-2 (EC 3_5_2_6)
 3_5_2_6 1222 *Mycobacterium tuberculosis* blaC PROBABLE BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 2792 *Mycobacterium tuberculosis* lpgF BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 3203 *Mycobacterium leprae* BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 3213 *Mycobacterium leprae* BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 2155 *Mycobacterium bovis* BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 2415 *Mycobacterium bovis* PROBABLE BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 111 *Klebsiella pneumoniae* O06025 BETA-LACTAMASE SHV-5A (EC 3_5_2_6)
 3_5_2_6 1202 *Klebsiella pneumoniae* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 6994 *Klebsiella pneumoniae* BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 6996 *Klebsiella pneumoniae* BETA-LACTAMASE SHV-I (EC 3_5_2_6)
 3_5_2_6 8897 *Klebsiella pneumoniae* BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 9205 *Klebsiella pneumoniae* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 6359 *Escherichia coli* ampC BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 505 *Clostridium difficile* METALLO-BETA-LACTAMASE L1 PRECURSOR (BETA-LACTAMASE, TYPE II) (EC 3_5_2_6)
 3_5_2_6 3406 *Clostridium difficile* BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 3411 *Clostridium difficile* BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 502 *Clostridium acetobutylicum* 35445890_F1_5 BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 2345 *Clostridium acetobutylicum* 24230267_C3_31 BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_6 4204 *Clostridium acetobutylicum* METALLO-BETA-LACTAMASE L1 PRECURSOR (BETA-LACTAMASE, TYPE II) (EC 3_5_2_6)
 3_5_2_6 2766 *Campylobacter jejuni* Cj0299 BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 4038 *Bordetella pertussis* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 4949 *Bordetella bronchiseptica* BETA-LACTAMASE PRECURSOR (EC 3_5_2_6)
 3_5_2_6 7024 *Bordetella bronchiseptica* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_6 210 *Bacillus subtilis* ybxI BETA-LACTAMASE (EC 3_5_2_6)
 3_5_2_7 7028 *Yersinia pseudotuberculosis* BS-hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 2538 *Yersinia pestis* Q9ZC74 IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 5031 *Vibrio cholerae* El Tor N16961 ORF01565 IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 1122 *Streptococcus pyogenes* hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 2088 *Staphylococcus aureus* BS-hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 2659 *Salmonella typhimurium* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 4068 *Salmonella typhi* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 565 *Salmonella paratyphi* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 3368 *Salmonella dublin* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 2278 *Pseudomonas aeruginosa* hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 4 *Porphyromonas gingivalis* BS-hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 4375 *Klebsiella pneumoniae* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 4376 *Klebsiella pneumoniae* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 1214 *Helicobacter pylori* HP0267 IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 257 *Helicobacter pylori* J99tr/Q9ZMG8 IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 1613 *Enterococcus faecalis* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 2262 *Bordetella pertussis* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 9262 *Bordetella bronchiseptica* IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_2_7 3930 *Bacillus subtilis* hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_3_11 7320 *Vibrio cholerae* El Tor N16961ORFA00536 AGMATINASE (EC 3_5_3_11)
 3_5_3_11 5675 *Salmonella typhimurium* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 6858 *Salmonella typhimurium* speB AGMATINASE (EC 3_5_3_11)
 3_5_3_11 561 *Salmonella typhi* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 3614 *Salmonella paratyphi* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 6450 *Salmonella paratyphi* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 1986 *Salmonella enteritidis* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 4703 *Salmonella dublin* AGMATINASE (EC 3_5_3_11)

3_5_3_11 7030 *Pseudomonas aeruginosa* speB2 AGMATINASE (EC 3_5_3_11)
 3_5_3_11 8006 *Pseudomonas aeruginosa* speB1 AGMATINASE (EC 3_5_3_11)
 3_5_3_11 154 *Pasteurella multocida* speE AGMATINASE (EC 3_5_3_11)
 3_5_3_11 1215 *Neisseria gonorrhoeae* EC-speB AGMATINASE (EC 3_5_3_11)
 3_5_3_11 1636 *Klebsiella pneumoniae* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 1637 *Klebsiella pneumoniae* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 3339 *Klebsiella pneumoniae* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 5744 *Escherichia coli* speB AGMATINASE (EC 3_5_3_11)
 3_5_3_11 640 *Clostridium difficile* EC-speB AGMATINASE (EC 3_5_3_11)
 3_5_3_11 3379 *Bordetella pertussis* PUTATIVE AGMATINASE PRECURSOR (EC 3_5_3_11)
 3_5_3_11 6073 *Bordetella bronchiseptica* AGMATINASE (EC 3_5_3_11)
 3_5_3_11 7873 *Bordetella bronchiseptica* PUTATIVE AGMATINASE PRECURSOR (EC 3_5_3_11)
 3_5_3_11 3743 *Bacillus subtilis* ywhG AGMATINASE (EC 3_5_3_11)
 3_5_3_19 6600 *Salmonella typhimurium* glxA2 UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 4814 *Salmonella typhi* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 5601 *Salmonella paratyphi* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 3523 *Salmonella enteritidis* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 1664 *Salmonella dublin* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 7021 *Saccharomyces cerevisiae* DAL3 UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 2790 *Pseudomonas aeruginosa* PA1514 UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 488 *Escherichia coli* b0505 UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 2125 *Bordetella pertussis* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_19 8647 *Bordetella bronchiseptica* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_4 2548 *Saccharomyces cerevisiae* DAL2 ALLANTOICASE (EC 3_5_3_4)
 3_5_3_4 2791 *Pseudomonas aeruginosa* alc ALLANTOICASE (EC 3_5_3_4)
 3_5_3_4 76 *Neurospora crassa* alc ALLANTOICASE (EC 3_5_3_4)
 3_5_3_6 4290 *Vibrio cholerae* El Tor N16961 ORF00596 ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 1429 *Streptococcus pyogenes* sagP (arcA) ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 715 *Streptococcus pneumoniae* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2842 *Staphylococcus aureus* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2468 *Salmonella typhimurium* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2557 *Salmonella typhi* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 3379 *Salmonella paratyphi* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 3380 *Salmonella paratyphi* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 1795 *Salmonella enteritidis* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2035 *Salmonella dublin* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2726 *Pseudomonas aeruginosa* arcA ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 283 *Mycoplasma pneumoniae* sp. P75218 ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 532 *Mycoplasma pneumoniae* arcA ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 533 *Mycoplasma pneumoniae* arcA ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 4486 *Mycobacterium tuberculosis* arcA ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 3624 *Mycobacterium bovis* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2778 *Enterococcus faecium* (DOE) ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 2249 *Enterococcus faecalis* ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 743 *Borrelia burgdorferi* BB0841 ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_6 1303 *Bacillus subtilis* ykgA ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_8 5030 *Vibrio cholerae* El Tor N16961 ORF01564 FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 1114 *Streptococcus pyogenes* hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 2666 *Staphylococcus aureus* BS-hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 1602 *Salmonella typhimurium* hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 3595 *Salmonella typhi* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 1880 *Salmonella paratyphi* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 638 *Salmonella enteritidis* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 3367 *Salmonella dublin* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 5988 *Pseudomonas aeruginosa* PA3175 FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 4377 *Klebsiella pneumoniae* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 4378 *Klebsiella pneumoniae* FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 2052 *Bordetella pertussis* BS-hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 7112 *Bordetella bronchiseptica* BS-hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_8 3931 *Bacillus subtilis* hutG FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_9 6912 *Yersinia pseudotuberculosis* BS-yurH allantoate deiminase (EC 3_5_3_9)
 3_5_3_9 5625 *Salmonella paratyphi* allantoate deiminase (EC 3_5_3_9)

3_5_3_9 4237 *Klebsiella pneumoniae* allantoate deiminase (EC 3_5_3_9)
 3_5_4_1 7885 *Yersinia pseudotuberculosis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1408 *Yersinia pestis* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 4037 *Yersinia pestis* EC-codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 4710 *Vibrio cholerae* El Tor N16961 ORF01148 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 864 *Streptococcus pyogenes* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1123 *Streptococcus pneumoniae* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1482 *Streptococcus mutans* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 775 *Streptococcus equi* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 912 *Staphylococcus aureus* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 6106 *Salmonella typhimurium* codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 6910 *Salmonella typhimurium* yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 559 *Salmonella typhi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1022 *Salmonella typhi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 771 *Salmonella paratyphi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 772 *Salmonella paratyphi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2841 *Salmonella paratyphi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2843 *Salmonella paratyphi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 712 *Salmonella enteritidis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 4092 *Salmonella enteritidis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 3739 *Salmonella dublin* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 4486 *Saccharomyces cerevisiae* TAD3 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 7002 *Saccharomyces cerevisiae* FCY1 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 803 *Rickettsia prowazekii* RP831 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1856 *Pseudomonas aeruginosa* PA3767 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 5963 *Pseudomonas aeruginosa* codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1109 *Porphyromonas gingivalis* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 317 *Pasteurella multocida* EC-codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 942 *Pasteurella multocida* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1156 *Pasteurella multocida* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 541 *Neisseria gonorrhoeae* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 3832 *Mycobacterium tuberculosis* Rv3752c CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 4095 *Mycobacterium bovis* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 3177 *Klebsiella pneumoniae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 6338 *Klebsiella pneumoniae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 6339 *Klebsiella pneumoniae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 7570 *Klebsiella pneumoniae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 7965 *Klebsiella pneumoniae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1927 *Haemophilus influenzae* HI0906 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 9072 *Haemophilus influenzae* HI0842 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 64 *Haemophilus ducreyi* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 219 *Haemophilus ducreyi* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 308 *Escherichia coli* b0324 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 321 *Escherichia coli* codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 5547 *Escherichia coli* yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 3709 *Enterococcus faecium* (DOE) CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1554 *Enterococcus faecalis* EC-codA CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1750 *Enterococcus faecalis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2319 *Enterococcus faecalis* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2362 *Enterococcus faecalis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2363 *Enterococcus faecalis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2068 *Corynebacterium diphtheriae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2069 *Corynebacterium diphtheriae* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 367 *Clostridium difficile* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 1911 *Clostridium acetobutylicum* 4886265_F3_9 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 807 *Chlamydia trachomatis* D/UW-3/Cx EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 852 *Chlamydia pneumoniae* AR39 CP0852 CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 926 *Chlamydia pneumoniae* CWL029 EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 2742 *Bordetella pertussis* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 7490 *Bordetella bronchiseptica* EC-yfhC CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_1 18 *Bacillus subtilis* yaaJ CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_13 6177 *Yersinia pseudotuberculosis* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)

3_5_4_13 1413 *Yersinia pestis* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 3318 *Salmonella typhimurium* paxA DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 3401 *Salmonella typhi* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 794 *Salmonella paratyphi* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 3155 *Salmonella dublin* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 68 *Rickettsia prowazekii* RP069 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1120 *Pseudomonas aeruginosa* PA3480 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1744 *Pasteurella multocida* dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1176 *Neisseria gonorrhoeae* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 3427 *Mycobacterium tuberculosis* dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 564 *Mycobacterium leprae* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 3670 *Mycobacterium bovis* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 8499 *Klebsiella pneumoniae* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1309 *Helicobacter pylori* HP0372 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1000 *Helicobacter pylori* J99sp|Q9ZKD0 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 7529 *Haemophilus influenzae* HI0133 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 571 *Haemophilus ducreyi* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 5259 *Escherichia coli* dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 1880 *Corynebacterium diphtheriae* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 762 *Clostridium acetobutylicum* 24877217_C1_35 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 36 *Chlamydia trachomatis* D/UW-3/Cx dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 363 *Chlamydia pneumoniae* AR39 CP0363 DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 354 *Chlamydia pneumoniae* CWL029 dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 2670 *Campylobacter jejuni* dcd DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 334 *Bordetella pertussis* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_13 6093 *Bordetella bronchiseptica* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_19 6635 *Yersinia pseudotuberculosis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 2944 *Yersinia pestis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 401 *Streptococcus mutans* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 1464 *Staphylococcus aureus* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 501 *Salmonella typhimurium* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 1641 *Salmonella typhi* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 6191 *Salmonella paratyphi* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 2826 *Salmonella enteritidis* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 2328 *Salmonella dublin* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 6837 *Saccharomyces cerevisiae* HIS4 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC 1_1_1_23)
 3_5_4_19 1626 *Pseudomonas aeruginosa* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 1897 *Pasteurella multocida* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 14 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE (EC 1_1_1_23)

3_5_4_19 15 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE
 (EC 1_1_1_23)
 3_5_4_19 172 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE
 (EC 1_1_1_23)
 3_5_4_19 936 *Neisseria gonorrhoeae* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 3166 *Mycobacterium tuberculosis* hisI2 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19)
 3_5_4_19 2922 *Mycobacterium leprae*tr[Q9X7C3] PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19)
 3_5_4_19 2502 *Mycobacterium bovis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 473 *Klebsiella pneumoniae* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 8280 *Haemophilus influenzae* HI0475 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 6489 *Escherichia coli* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 1804 *Corynebacterium diphtheriae* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 1149 *Clostridium difficile* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 2124 *Clostridium acetobutylicum* 7087542_C2_36 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE
 (EC 3_5_4_19)
 3_5_4_19 905 *Campylobacter jejuni* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_19 767 *Bordetella pertussis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19)
 3_5_4_19 7970 *Bordetella bronchiseptica* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19)
 3_5_4_19 3481 *Bacillus subtilis* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_2 799 *Klebsiella pneumoniae* ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 800 *Klebsiella pneumoniae* ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 1613 *Klebsiella pneumoniae* ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 3584 *Escherichia coli* yicP ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 2708 *Enterococcus faecium* (DOE) ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 1614 *Enterococcus faecalis* EC-yicP ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 2433 *Clostridium difficile* EC-yicP ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 2983 *Clostridium acetobutylicum* 789012_C3_19 ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 1285 *Borrelia burgdorferi* BBK17 ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 657 *Bacillus subtilis* yeaA ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_2 1453 *Bacillus subtilis* adeC ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_23 1867 *Clostridium acetobutylicum* 4812802_C2_34 BLASTICIDIN-S DEAMINASE (EC 3_5_4_23)
 3_5_4_25 5338 *Yersinia pseudotuberculosis* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 455 *Yersinia pestis* EC-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 5088 *Vibrio cholerae* El Tor N16961 ORF01642 GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 1207 *Streptococcus pneumoniae* BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-
 DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 834 *Staphylococcus aureus* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-
 2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 2864 *Salmonella typhimurium* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 2438 *Salmonella typhi* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 180 *Salmonella paratyphi* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 1712 *Salmonella enteritidis* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 310 *Salmonella dublin* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 6270 *Saccharomyces cerevisiae* RIB1 GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 488 *Pseudomonas aeruginosa* ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-
 2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 5047 *Pseudomonas aeruginosa* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 220 *Porphyromonas gingivalis* BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-
 DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 1612 *Pasteurella multocida* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 81 *Neisseria gonorrhoeae* EC-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)

3_5_4_25 1778 *Neisseria gonorrhoeae* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 423 *Mycobacterium tuberculosis* ribA2 GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 879 *Mycobacterium tuberculosis* Rv0756c GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 1360 *Mycobacterium tuberculosis* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE
 3_5_4_25 2032 *Mycobacterium leprae* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 2059 *Mycobacterium leprae* GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 624 *Mycobacterium bovis* GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 804 *Mycobacterium bovis* GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 4007 *Mycobacterium bovis* BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 3514 *Klebsiella pneumoniae* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 3515 *Klebsiella pneumoniae* GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 225 *Helicobacter pylori* HP0802 GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 227 *Helicobacter pylori* HP0804 GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 737 *Helicobacter pylori* J99 ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 739 *Helicobacter pylori* J99 ribBA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 467 *Haemophilus influenzae* HI0212 GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 692 *Haemophilus ducreyi* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 4850 *Escherichia coli* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 994 *Corynebacterium diphtheriae* GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 3267 *Clostridium difficile* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 1404 *Clostridium acetobutylicum* 5938828_C2_49 GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 700 *Chlamydia trachomatis* D/UW-3/Cx BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 997 *Chlamydia pneumoniae* AR39 CP0997 GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 804 *Chlamydia pneumoniae* CWL029 BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 1429 *Campylobacter jejuni* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 1805 *Campylobacter jejuni* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_25 3710 *Bordetella pertussis* BS-ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 5964 *Bordetella bronchiseptica* GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_25 2322 *Bacillus subtilis* ribA GTP CYCLOHYDROLASE II (EC 3_5_4_25) / 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE (EC 4_1_2_-)
 3_5_4_26 4162 *Yersinia pseudotuberculosis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 2738 *Yersinia pestis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 6045 *Vibrio cholerae* El Tor N16961 ORF02878
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)

3_5_4_26 1209 *Streptococcus pneumoniae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 2886 *Staphylococcus aureus* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 3817 *Staphylococcus aureus* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 5139 *Salmonella typhimurium* ribG DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 4789 *Salmonella typhi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 4743 *Salmonella paratyphi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 4744 *Salmonella paratyphi* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 4745 *Salmonella paratyphi* diaminohydroxyphosphoribosylaminopyrimidine deaminase (EC 3_5_4_26)
 3_5_4_26 1289 *Saccharomyces cerevisiae* RIB2 diaminohydroxyphosphoribosylaminopyrimidine deaminase (EC 3_5_4_26)
 3_5_4_26 4276 *Saccharomyces cerevisiae* YDL036C diaminohydroxyphosphoribosylaminopyrimidine deaminase (EC 3_5_4_26)
 3_5_4_26 7834 *Saccharomyces cerevisiae* YGR169C diaminohydroxyphosphoribosylaminopyrimidine deaminase (EC 3_5_4_26)
 3_5_4_26 1372 *Pseudomonas aeruginosa* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1441 *Porphyromonas gingivalis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 669 *Pasteurella multocida* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1383 *Neisseria gonorrhoeae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 418 *Mycobacterium tuberculosis* ribG
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1752 *Mycobacterium leprae* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1230 *Mycobacterium bovis* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1404 *Mycobacterium bovis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1440 *Klebsiella pneumoniae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1441 *Klebsiella pneumoniae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 885 *Helicobacter pylori* HP1505 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)

3_5_4_26 1385 *Helicobacter pylori* J99trQ9ZJB5
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 2004 *Haemophilus influenzae* HI0944
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 694 *Haemophilus ducreyi* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 398 *Escherichia coli* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 992 *Corynebacterium diphtheriae* DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 3269 *Clostridium difficile* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1406 *Clostridium acetobutylicum* 16182701_C1_42
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 699 *Chlamydia trachomatis* D/UW-3/Cx EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 998 *Chlamydia pneumoniae* AR39 CP0998
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 803 *Chlamydia pneumoniae* CWL029 EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 936 *Campylobacter jejuni* ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 1610 *Bordetella pertussis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 8367 *Bordetella bronchiseptica* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_4_26 2324 *Bacillus subtilis* ribG DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_5_1 1428 *Streptococcus mutans* BS-ykrU NITRILASE (EC 3_5_5_1)
 3_5_5_1 39 *Pseudomonas aeruginosa* PA3598 NITRILASE (EC 3_5_5_1)
 3_5_5_1 3034 *Pseudomonas aeruginosa* PA3093 NITRILASE 2 (EC 3_5_5_1)
 3_5_5_1 20340 *Neurospora crassa* NITRILASE 2 (EC 3_5_5_1)
 3_5_5_1 862 *Helicobacter pylori* HP1481 NITRILASE (EC 3_5_5_1)
 3_5_5_1 1361 *Helicobacter pylori* J99trQ9ZJD8 NITRILASE (EC 3_5_5_1)
 3_5_5_1 412 *Clostridium difficile* NITRILASE (EC 3_5_5_1)
 3_5_5_1 2466 *Clostridium difficile* NITRILASE (EC 3_5_5_1)
 3_5_5_1 3229 *Clostridium difficile* NITRILASE 4 (EC 3_5_5_1)
 3_5_5_1 1693 *Campylobacter jejuni* Cj1056c NITRILASE (EC 3_5_5_1)
 3_5_5_1 5705 *Bordetella bronchiseptica* NITRILASE 4 (EC 3_5_5_1)
 3_5_5_1 6385 *Bordetella bronchiseptica* NITRILASE (EC 3_5_5_1)
 3_5_5_1 1358 *Bacillus subtilis* ykrU NITRILASE (EC 3_5_5_1)
 3_5_5_7 471 *Saccharomyces cerevisiae* NIT1 ALIPHATIC NITRILASE (EC 3_5_5_7)
 3_6_1_10 7046 *Saccharomyces cerevisiae* PHM5 alkaline phosphatase vacuolar precursor (EC 3_1_3_1) / endopolyphosphatase vacuolar precursor (EC 3_6_1_10)
 3_6_1_11 8103 *Yersinia pseudotuberculosis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1559 *Yersinia pestis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 524 *Vibrio cholerae* El Tor N16961 ORF00977 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 619 *Streptococcus pyogenes* EXOPOLYPHOSPHATASE (EC 3_6_1_11)

3_6_1_11 25 *Streptococcus mutans*sp|O68579 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1891 *Staphylococcus aureus* BS-yybQ EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1060 *Salmonella typhimurium* ppx EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3524 *Salmonella typhi* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 4705 *Salmonella paratyphi* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 4706 *Salmonella paratyphi* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3071 *Salmonella enteritidis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3073 *Salmonella enteritidis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3811 *Salmonella dublin* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 5463 *Saccharomyces cerevisiae* PPX1 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 288 *Rickettsia prowazekii* RP294 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 7571 *Pseudomonas aeruginosa* ppx EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1572 *Porphyromonas gingivalis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 822 *Pasteurella multocida* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 324 *Neisseria gonorrhoeae* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 333 *Mycobacterium tuberculosis* Rv0496 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 4444 *Mycobacterium tuberculosis* Rv1026 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 352 *Mycobacterium leprae*sp|P54882 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3674 *Mycobacterium leprae*tr|O69585 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1305 *Mycobacterium bovis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3786 *Mycobacterium bovis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 8571 *Klebsiella pneumoniae* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 8572 *Klebsiella pneumoniae* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1225 *Helicobacter pylori* HP0278 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 268 *Helicobacter pylori* J99tr|Q9ZMF7 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 16816 *Haemophilus influenzae* HI0695 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 915 *Haemophilus ducreyi* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 2442 *Escherichia coli* ppx EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1939 *Enterococcus faecalis* BS-yybQ EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1940 *Enterococcus faecalis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 615 *Corynebacterium diphtheriae* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3146 *Clostridium difficile* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 2291 *Clostridium acetobutylicum* 4954457_C2_16 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 3378 *Clostridium acetobutylicum* 26384687_F3_9 EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 2337 *Campylobacter jejuni* Cj0353c EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 2565 *Campylobacter jejuni* Cj1237c EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 1826 *Bordetella pertussis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_11 7067 *Bordetella bronchiseptica* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_22 3886 *Escherichia coli* yjaD NADH PYROPHOSPHATASE (EC 3_6_1_22)
 3_6_1_26 7057 *Yersinia pseudotuberculosis* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 3635 *Yersinia pestis* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 963 *Salmonella typhimurium* ushB CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 4527 *Salmonella typhi* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 2381 *Salmonella paratyphi* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 2382 *Salmonella paratyphi* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 754 *Salmonella dublin* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 767 *Mycobacterium tuberculosis* cdh CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 31 *Mycobacterium leprae* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 730 *Mycobacterium bovis* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 4423 *Klebsiella pneumoniae* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 291 *Helicobacter pylori* HP0871 CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 804 *Helicobacter pylori* J99tr|Q9ZKX9 CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_26 3816 *Escherichia coli* cdh CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_31 6635 *Yersinia pseudotuberculosis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 2944 *Yersinia pestis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 911 *Streptococcus mutans* PHOSPHORIBOSYL-ATP PYROPHOSPHATASE (EC 3_6_1_31)
 3_6_1_31 1464 *Staphylococcus aureus* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)

3_6_1_31 501 *Salmonella typhimurium* hisE PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 1641 *Salmonella typhi* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 6191 *Salmonella paratyphi* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 2826 *Salmonella enteritidis* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 2328 *Salmonella dublin* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 6837 *Saccharomyces cerevisiae* HIS4 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL
 DEHYDROGENASE (EC 1_1_1_23)
 3_6_1_31 1625 *Pseudomonas aeruginosa* hisE PHOSPHORIBOSYL-ATP PYROPHOSPHATASE (EC 3_6_1_31)
 3_6_1_31 1897 *Pasteurella multocida* hisE PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 14 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE
 (EC 1_1_1_23)
 3_6_1_31 15 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE
 (EC 1_1_1_23)
 3_6_1_31 172 *Neurospora crassa* his-3 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31) / HISTIDINOL DEHYDROGENASE
 (EC 1_1_1_23)
 3_6_1_31 1071 *Neisseria gonorrhoeae* PHOSPHORIBOSYL-ATP PYROPHOSPHATASE (EC 3_6_1_31)
 3_6_1_31 5804 *Mycobacterium tuberculosis* hisI PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC
 3_6_1_31)
 3_6_1_31 943 *Mycobacterium lepraes* [Q49786] PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC
 3_6_1_31)
 3_6_1_31 4047 *Mycobacterium bovis* PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 473 *Klebsiella pneumoniae* PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 8280 *Haemophilus influenzae* HI0475 PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC
 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 6489 *Escherichia coli* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 1149 *Clostridium difficile* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 2123 *Clostridium acetobutylicum* 36605067_C1_33 PHOSPHORIBOSYL-ATP PYROPHOSPHATASE
 (EC 3_6_1_31)
 3_6_1_31 905 *Campylobacter jejuni* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_31 768 *Bordetella pertussis* PHOSPHORIBOSYL-ATP PYROPHOSPHATASE (EC 3_6_1_31)
 3_6_1_31 7971 *Bordetella bronchiseptica* PHOSPHORIBOSYL-ATP PYROPHOSPHATASE (EC 3_6_1_31)
 3_6_1_31 3481 *Bacillus subtilis* hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) /
 PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_35 5832 *Saccharomyces cerevisiae* PMA2 PLASMA MEMBRANE ATPASE 2 (EC 3_6_1_35)
 3_6_1_35 6176 *Saccharomyces cerevisiae* PMA1 PLASMA MEMBRANE ATPASE 1 (EC 3_6_1_35)
 3_6_1_35 89 *Neurospora crassa* AAA33561_1 PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 91 *Neurospora crassa* AAA33563_1 PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 1775 *Mycobacterium tuberculosis* ctpE PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 1079 *Mycobacterium bovis* PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 2410 *Enterococcus faecium* (DOE) PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 2736 *Enterococcus faecalis* PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_35 699 *Clostridium difficile* PLASMA MEMBRANE ATPASE (EC 3_6_1_35)
 3_6_1_40 6862 *Yersinia pseudotuberculosis* EC-gppA GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 2356 *Yersinia pestis* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE PYROPHOSPHATASE
 (EC 3_6_1_40)
 3_6_1_40 2357 *Yersinia pestis* EC-gppA GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)

3_6_1_40 4180 *Vibrio cholerae* El Tor N16961 ORF00428 GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 2289 *Salmonella typhimurium* gppA GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 2674 *Salmonella typhi* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE PYROPHOSPHATASE
 (EC 3_6_1_40)
 3_6_1_40 5572 *Salmonella paratyphi* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 4123 *Salmonella enteritidis* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 4518 *Salmonella dublin* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE PYROPHOSPHATASE
 (EC 3_6_1_40)
 3_6_1_40 2198 *Klebsiella pneumoniae* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 2199 *Klebsiella pneumoniae* GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_40 6197 *Escherichia coli* gppA GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE
 PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_41 6276 *Yersinia pseudotuberculosis* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 856 *Yersinia pestis* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 4307 *Vibrio cholerae* El Tor N16961 ORF00621 BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 927 *Streptococcus pneumoniae* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL)
 (EC 3_6_1_41)
 3_6_1_41 6761 *Salmonella typhimurium* apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 1193 *Salmonella typhi* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 5680 *Salmonella paratyphi* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 4165 *Salmonella enteritidis* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 3570 *Salmonella dublin* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 1283 *Saccharomyces cerevisiae* YNL217W BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 1343 *Pseudomonas aeruginosa* PA3087 BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 1652 *Pseudomonas aeruginosa* apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 1901 *Pasteurella multocida* adaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL)
 (EC 3_6_1_41)
 3_6_1_41 330 *Neisseria gonorrhoeae* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 2042 *Klebsiella pneumoniae* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 2043 *Klebsiella pneumoniae* BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 4803 *Haemophilus influenzae* HI0551 BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 613 *Haemophilus ducreyi* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL)
 (EC 3_6_1_41)
 3_6_1_41 4302 *Escherichia coli* apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)
 3_6_1_41 2096 *Campylobacter jejuni* Cj0184c BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 8175 *Bordetella bronchiseptica* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE
 (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_41 1164 *Bacillus subtilis* yjbP BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC
 3_6_1_41)

3_6_1_45 3730 *Yersinia pestis* UDP-SUGAR HYDROLASE PRECURSOR (EC 3_6_1_45)
 3_6_1_45 3731 *Yersinia pestis* UDP-SUGAR HYDROLASE PRECURSOR (EC 3_6_1_45)
 3_6_1_45 3538 *Salmonella paratyphi* UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_1_45 3539 *Salmonella paratyphi* UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_1_45 3540 *Salmonella paratyphi* UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_1_45 5139 *Klebsiella pneumoniae* UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_1_45 5140 *Klebsiella pneumoniae* UDP-SUGAR HYDROLASE PRECURSOR (EC 3_6_1_45)
 3_6_1_45 621 *Haemophilus ducreyi* UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_1_45 463 *Escherichia coli* ushA UDP-SUGAR HYDROLASE (EC 3_6_1_45)
 3_6_3_12 859 *Salmonella dublin* POTASSIUM-TRANSPORTING ATPASE B CHAIN (EC 3_6_3_12)
 3_7_1_3 1374 *Saccharomyces cerevisiae* YLR231C KYNURENINASE, L-KYNURENINE HYDROLASE (EC 3_7_1_3)
 3_7_1_3 6310 *Pseudomonas aeruginosa* PA2080 KYNURENINASE, L-KYNURENINE HYDROLASE (EC 3_7_1_3)
 3_7_1_3 2806 *Bordetella pertussis* BS-ycbU KYNURENINASE, L-KYNURENINE HYDROLASE (EC 3_7_1_3)
 3_7_1_3 7248 *Bordetella bronchiseptica* BS-ycbU KYNURENINASE, L-KYNURENINE HYDROLASE (EC 3_7_1_3)
 3_7_1_5 4076 *Salmonella typhimurium* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 749 *Salmonella typhi* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 1959 *Salmonella paratyphi* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 3461 *Salmonella enteritidis* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 6461 *Pseudomonas aeruginosa* PA2471 fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 3003 *Bordetella pertussis* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_7_1_5 6490 *Bordetella bronchiseptica* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_8_1_2 4935 *Yersinia pseudotuberculosis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 7341 *Yersinia pseudotuberculosis* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 147 *Yersinia pestis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 2388 *Yersinia pestis* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 7114 *Vibrio cholerae* El Tor N16961ORFA00276 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 402 *Streptococcus pyogenes* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1633 *Streptococcus pneumoniae* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 692 *Streptococcus mutans* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1313 *Staphylococcus aureus* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1929 *Salmonella typhimurium* yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 3199 *Salmonella typhimurium* yihX 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1684 *Salmonella typhi* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 4134 *Salmonella typhi* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 3024 *Salmonella paratyphi* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 5762 *Salmonella paratyphi* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 564 *Salmonella enteritidis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 3646 *Salmonella enteritidis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 5071 *Pseudomonas aeruginosa* PA0810 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1154 *Porphyromonas gingivalis* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1725 *Porphyromonas gingivalis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1155 *Pasteurella multocida* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 2688 *Mycobacterium tuberculosis* Rv3376 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 508 *Mycobacterium bovis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 4905 *Klebsiella pneumoniae* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 4906 *Klebsiella pneumoniae* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 4907 *Klebsiella pneumoniae* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 6974 *Klebsiella pneumoniae* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 6975 *Klebsiella pneumoniae* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1100 *Haemophilus ducreyi* EC-yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 3317 *Escherichia coli* yrfG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 3784 *Escherichia coli* yihX 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 4256 *Escherichia coli* yjjG 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 1626 *Enterococcus faecium* (DOE) 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 2112 *Enterococcus faecium* (DOE) 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)

3_8_1_2 62 *Enterococcus faecalis* EC-yjg 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 2290 *Enterococcus faecalis* 2-HALOALKANOIC ACID DEHALOGENASE (EC 3_8_1_2)
 3_8_1_2 1795 *Clostridium difficile* EC-yjg 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 2747 *Clostridium difficile* 2-HALOALKANOIC ACID DEHALOGENASE (EC 3_8_1_2)
 3_8_1_2 900 *Bordetella pertussis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 8775 *Bordetella bronchiseptica* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_2 733 *Bacillus subtilis* yfnB 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_3 5385 *Salmonella typhimurium* HALOACETATE DEHALOGENASE H-1 (EC 3_8_1_3)
 3_8_1_3 4400 *Salmonella enteritidis* HALOACETATE DEHALOGENASE H-1 (EC 3_8_1_3)
 3_8_1_3 4149 *Salmonella dublin* HALOACETATE DEHALOGENASE H-1 (EC 3_8_1_3)
 3_8_1_3 5303 *Pseudomonas aeruginosa* PA2086 HALOACETATE DEHALOGENASE H-1 (EC 3_8_1_3)
 3_8_1_5 758 *Mycobacterium tuberculosis* Rv2296 HALOALKANE DEHALOGENASE (EC 3_8_1_5)
 3_8_1_5 3093 *Mycobacterium bovis* HALOALKANE DEHALOGENASE (EC 3_8_1_5)
 4_1_1_1 4824 *Saccharomyces cerevisiae* PDC6 PYRUVATE DECARBOXYLASE ISOZYME 3 (EC 4_1_1_1)
 4_1_1_1 4833 *Saccharomyces cerevisiae* PDC5 PYRUVATE DECARBOXYLASE ISOZYME 2 (EC 4_1_1_1)
 4_1_1_1 7934 *Saccharomyces cerevisiae* PDC1 PYRUVATE DECARBOXYLASE ISOZYME 1 (EC 4_1_1_1)
 4_1_1_1 303 *Neurospora crassa* cfp PYRUVATE DECARBOXYLASE (EC 4_1_1_1)
 4_1_1_1 20685 *Neurospora crassa* cfp PYRUVATE DECARBOXYLASE (EC 4_1_1_1)
 4_1_1_1 20695 *Neurospora crassa* cfp PYRUVATE DECARBOXYLASE (EC 4_1_1_1)
 4_1_1_1 7186 *Yersinia pseudotuberculosis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1810 *Yersinia pestis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1602 *Staphylococcus aureus* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1984 *Salmonella typhimurium* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 2470 *Salmonella typhi* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 5834 *Salmonella paratyphi* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 5835 *Salmonella paratyphi* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3031 *Salmonella enteritidis* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3732 *Salmonella dublin* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3344 *Pseudomonas aeruginosa* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1488 *Porphyromonas gingivalis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1664 *Neisseria gonorrhoeae* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 2983 *Mycobacterium tuberculosis* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3413 *Mycobacterium leprae* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1830 *Klebsiella pneumoniae* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1831 *Klebsiella pneumoniae* ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 995 *Helicobacter pylori* HP0034 ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 30 *Helicobacter pylori* J99 panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 4339 *Escherichia coli* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3278 *Enterococcus faecium* (DOE) ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 1845 *Enterococcus faecalis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 997 *Clostridium acetobutylicum* 29301552_C3_56 ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 2250 *Campylobacter jejuni* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 3758 *Bordetella pertussis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 8287 *Bordetella bronchiseptica* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_1 2237 *Bacillus subtilis* panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_1)
 4_1_1_18 611 *Vibrio cholerae* El Tor N16961 ORF00395 LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_18 1001 *Streptococcus pneumoniae* EC-ldcC LYSINE DECARBOXYLASE (EC 4_1_1_18)
 4_1_1_18 2744 *Staphylococcus aureus* LYSINE DECARBOXYLASE (EC 4_1_1_18)
 4_1_1_18 3502 *Salmonella typhimurium* cadA LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)

4_1_1_18 5566 *Salmonella typhimurium* ldcC LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 4701 *Salmonella typhi* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 5801 *Salmonella typhi* LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_18 1174 *Salmonella paratyphi* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 1175 *Salmonella paratyphi* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 3120 *Salmonella paratyphi* LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_18 3562 *Salmonella enteritidis* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 3482 *Salmonella dublin* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 3505 *Pseudomonas aeruginosa* PA1346 LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 450 *Mycobacterium leprae* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 1336 *Klebsiella pneumoniae* LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_18 1984 *Klebsiella pneumoniae* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 1985 *Klebsiella pneumoniae* LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 186 *Escherichia coli* ldcC LYSINE DECARBOXYLASE, CONSTITUTIVE (EC 4_1_1_18)
 4_1_1_18 6347 *Escherichia coli* cadA LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_18 1454 *Clostridium acetobutylicum* 30758438_F3_26 LYSINE DECARBOXYLASE (EC 4_1_1_18)
 4_1_1_18 1464 *Bacillus subtilis* cad LYSINE DECARBOXYLASE (EC 4_1_1_18)
 4_1_1_19 4352 *Yersinia pseudotuberculosis* EC-speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 6955 *Yersinia pseudotuberculosis* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 2552 *Yersinia pestis* EC-speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 4208 *Yersinia pestis* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 7321 *Vibrio cholerae* El Tor N16961ORFA00537 BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 2817 *Staphylococcus aureus* EC-speF ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 5687 *Salmonella typhimurium* speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 5874 *Salmonella typhimurium* adi BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 562 *Salmonella typhi* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3254 *Salmonella typhi* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 81 *Salmonella paratyphi* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 82 *Salmonella paratyphi* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 1216 *Salmonella paratyphi* BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3611 *Salmonella paratyphi* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3612 *Salmonella paratyphi* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3613 *Salmonella paratyphi* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 2159 *Salmonella enteritidis* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3278 *Salmonella dublin* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 6231 *Pseudomonas aeruginosa* speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 8295 *Pseudomonas aeruginosa* PA1818 BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 155 *Pasteurella multocida* speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 1214 *Neisseria gonorrhoeae* EC-speA ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3337 *Klebsiella pneumoniae* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 3338 *Klebsiella pneumoniae* BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 1357 *Helicobacter pylori* HP0422 ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 954 *Helicobacter pylori* J99trQ9ZKH4 ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 5745 *Escherichia coli* speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 6338 *Escherichia coli* adi BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 637 *Clostridium difficile* EC-ldcC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 2613 *Clostridium difficile* ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 1982 *Clostridium acetobutylicum* 1220943_C2_26 ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 1362 *Campylobacter jejuni* speA ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 329 *Bordetella pertussis* EC-ldcC BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 7892 *Bordetella bronchiseptica* EC-ldcC BIODEGRADATIVE ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_19 27 *Bacillus subtilis* yaaO ARGININE DECARBOXYLASE (EC 4_1_1_19)

4_1_1_2 1184 *Streptococcus mutans* OXALATE DECARBOXYLASE (EC 4_1_1_2)
 4_1_1_2 1865 *Bacillus subtilis* yoaN OXALATE DECARBOXYLASE (EC 4_1_1_2)
 4_1_1_2 3319 *Bacillus subtilis* yvrK OXALATE DECARBOXYLASE (EC 4_1_1_2)
 4_1_1_20 7661 *Yersinia pseudotuberculosis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 476 *Yersinia pestis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 4009 *Vibrio cholerae* El Tor N16961 ORF00180 DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 710 *Streptococcus pneumoniae* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 366 *Streptococcus mutans* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1769 *Staphylococcus aureus* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2068 *Staphylococcus aureus* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5021 *Salmonella typhimurium* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5330 *Salmonella typhimurium* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 506 *Salmonella typhi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2347 *Salmonella typhi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 888 *Salmonella paratyphi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5121 *Salmonella paratyphi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5122 *Salmonella paratyphi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5416 *Salmonella paratyphi* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2484 *Salmonella enteritidis* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2267 *Salmonella dublin* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 3939 *Salmonella dublin* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2460 *Pseudomonas aeruginosa* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 240 *Porphyromonas gingivalis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 110 *Pasteurella multocida* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 231 *Neisseria gonorrhoeae* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 908 *Mycobacterium tuberculosis* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2810 *Mycobacterium leprae* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1681 *Mycobacterium bovis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 8015 *Klebsiella pneumoniae* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 8016 *Klebsiella pneumoniae* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1237 *Helicobacter pylori* HP0290 DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 279 *Helicobacter pylori* J99spJQ9ZME5 DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 20352 *Haemophilus influenzae* HI0727 DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1138 *Haemophilus ducreyi* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 5689 *Escherichia coli* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1724 *Enterococcus faecium* (DOE) DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2717 *Enterococcus faecalis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 923 *Corynebacterium diphtheriae* DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1939 *Clostridium difficile* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 556 *Clostridium acetobutylicum* 30757716_C1_41 DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2273 *Campylobacter jejuni* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 1165 *Bordetella pertussis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 6504 *Bordetella bronchiseptica* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_20 2334 *Bacillus subtilis* lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_25 20388 *Neurospora crassa* TYROSINE DECARBOXYLASE 4 (EC 4_1_1_25)
 4_1_1_3 4412 *Vibrio cholerae* El Tor N16961 ORF00764 OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4647 *Vibrio cholerae* El Tor N16961 ORF01061 OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 383 *Treponema pallidum* TP0056 OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 384 *Treponema pallidum* TP0057 OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 949 *Treponema pallidum* TP0055 OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 290 *Streptococcus pyogenes* oadA OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 847 *Streptococcus pyogenes* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 920 *Streptococcus mutans* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 695 *Streptococcus equi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 3423 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)

4_1_1_3 3628 *Salmonella typhimurium* oadG OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 4131 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 4136 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 6764 *Salmonella typhimurium* oadA OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 6849 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 6850 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 6851 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 6852 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 6853 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 7068 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 7069 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 7070 *Salmonella typhimurium* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 3897 *Salmonella typhi* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 4735 *Salmonella typhi* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 4736 *Salmonella typhi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 5389 *Salmonella typhi* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 5814 *Salmonella typhi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4876 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 4877 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4879 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4880 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4881 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 4882 *Salmonella paratyphi* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 4088 *Salmonella enteritidis* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 4089 *Salmonella enteritidis* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4090 *Salmonella enteritidis* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 160 *Salmonella dublin* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 269 *Salmonella dublin* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 1603 *Salmonella dublin* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 2659 *Salmonella dublin* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 8068 *Pseudomonas aeruginosa* PA5435 OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 1160 *Porphyromonas gingivalis* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 108 *Pasteurella multocida* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 109 *Pasteurella multocida* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 1989 *Pasteurella multocida* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 282 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 1415 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 1416 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4486 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 4488 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 7001 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE GAMMA CHAIN (EC 4_1_1_3)
 4_1_1_3 7002 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 7003 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 7004 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 7005 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 7006 *Klebsiella pneumoniae* OXALOACETATE DECARBOXYLASE BETA CHAIN (EC 4_1_1_3)
 4_1_1_3 1019 *Enterococcus faecalis* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 1893 *Campylobacter jejuni* pycB OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 2285 *Bordetella pertussis* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 5209 *Bordetella bronchiseptica* OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)
 4_1_1_3 5142 *Yersinia pseudotuberculosis* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_3 3962 *Yersinia pestis* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_3 6395 *Vibrio cholerae* El Tor N16961 ORF03345 PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_3 317 *Streptococcus pyogenes* ppc PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_3 1541 *Streptococcus pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_3 415 *Streptococcus mutans* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)

4_1_1_31 574 *Streptococcus equi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 1817 *Salmonella typhimurium* glu PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 2407 *Salmonella typhi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 2423 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 2424 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 2425 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 2426 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 3604 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 800 *Salmonella dublin* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 6249 *Pseudomonas aeruginosa* ppc PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 701 *Pasteurella multocida* ppc PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 495 *Neisseria gonorrhoeae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 87 *Mycobacterium lepraespl*P46710 PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 7477 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 7478 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 7479 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 6941 *Haemophilus influenzae* HI1636 PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 6267 *Escherichia coli* ppc PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 835 *Corynebacterium diphtheriae* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 3819 *Bordetella pertussis* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_31 6715 *Bordetella bronchiseptica* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_36 6572 *Yersinia pseudotuberculosis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 546 *Yersinia pestis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 4097 *Vibrio cholerae* El Tor N16961 ORF00307 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1285 *Streptococcus pyogenes* dpfB PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1286 *Streptococcus pyogenes* dfp PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 988 *Streptococcus pneumoniae* BS-yloI PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 63 *Streptococcus equi* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1049 *Staphylococcus aureus* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 6016 *Salmonella typhimurium* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 511 *Salmonella typhi* PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1041 *Salmonella paratyphi* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 482 *Salmonella enteritidis* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 8 *Pseudomonas aeruginosa* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 651 *Porphyromonas gingivalis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1846 *Pasteurella multocida* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1026 *Neisseria gonorrhoeae* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 438 *Mycobacterium tuberculosis* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 3501 *Mycobacterium leprae* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 2319 *Mycobacterium bovis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 7928 *Klebsiella pneumoniae* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 7929 *Klebsiella pneumoniae* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)

4_1_1_36 263 *Helicobacter pylori* HP0841 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 778 *Helicobacter pylori* J99 dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 2027 *Haemophilus influenzae* HI0953 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC
 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1180 *Haemophilus ducreyi* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5)
 / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 3559 *Escherichia coli* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 4051 *Enterococcus faecium* (DOE) PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE
 (EC 4_1_1_36)
 4_1_1_36 2106 *Enterococcus faecalis* BS-yloI PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE
 (EC 4_1_1_36)
 4_1_1_36 325 *Corynebacterium diphtheriae* PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 147 *Clostridium difficile* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 2957 *Clostridium acetobutylicum* 26601507_C3_23 PHOSPHOPANTOTHENATE--CYSTEINE
 LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 401 *Campylobacter jejuni* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 363 *Borrelia burgdorferi* BB0812 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 978 *Bordetella pertussis* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC
 4_1_1_36)
 4_1_1_36 979 *Bordetella pertussis* PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC
 4_1_1_36)
 4_1_1_36 5054 *Bordetella bronchiseptica* BS-yloI PHOSPHOPANTOTHENOYL CYSTEINE
 DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_36 1570 *Bacillus subtilis* yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) /
 PHOSPHOPANTOTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_39 1360 *Bacillus subtilis* ykrW RIBULOSE BIPHOSPHATE CARBOXYLASE LARGE CHAIN (EC
 4_1_1_39)
 4_1_1_4 674 *Clostridium acetobutylicum* 26181517_CI_30 ACETOACETATE DECARBOXYLASE (EC
 4_1_1_4)
 4_1_1_41 849 *Streptococcus pyogenes* methylmalonyl-CoA decarboxylase gamma chain (EC 4_1_1_41)
 4_1_1_41 850 *Streptococcus pyogenes* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_41 1715 *Streptococcus pyogenes* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_41 476 *Streptococcus mutans* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_41 71 *Streptococcus equi* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_41 1816 *Porphyromonas gingivalis* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT
 (EC 4_1_1_41)
 4_1_1_41 2841 *Escherichia coli* b2919 methylmalonyl-CoA decarboxylase (EC 4_1_1_41)
 4_1_1_41 1013 *Enterococcus faecalis* METHYLMALONYL-COA DECARBOXYLASE, BETA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_41 1820 *Bacillus subtilis* yngE METHYLMALONYL-COA DECARBOXYLASE, ALPHA-SUBUNIT (EC
 4_1_1_41)
 4_1_1_44 4250 *Yersinia pseudotuberculosis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC
 4_1_1_44)
 4_1_1_44 7572 *Yersinia pseudotuberculosis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC
 4_1_1_44)
 4_1_1_44 2087 *Yersinia pestis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 4832 *Yersinia pestis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 1846 *Streptococcus mutans* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 2130 *Pseudomonas aeruginosa* pcaC 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC
 4_1_1_44)

4_1_1_44 7194 *Pseudomonas aeruginosa* PA4486 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 872 *Mycobacterium tuberculosis* Rv0771 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 789 *Mycobacterium bovis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 2180 *Klebsiella pneumoniae* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 5197 *Klebsiella pneumoniae* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 1543 *Enterococcus faecium* (DOE) 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 1639 *Bordetella pertussis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_44 4129 *Bacillus subtilis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_47 6602 *Salmonella typhimurium* gcl GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 1394 *Salmonella typhi* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 5604 *Salmonella paratyphi* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 5605 *Salmonella paratyphi* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 5606 *Salmonella paratyphi* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 3006 *Salmonella enteritidis* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 1072 *Salmonella dublin* GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 2835 *Pseudomonas aeruginosa* gcl GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_47 490 *Escherichia coli* gcl GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_48 6735 *Yersinia pseudotuberculosis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 2569 *Yersinia pestis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 1506 *Streptococcus pneumoniae* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 803 *Streptococcus mutans* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 3403 *Staphylococcus aureus* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 861 *Salmonella typhimurium* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 393 *Salmonella typhi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 2877 *Salmonella paratyphi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 2878 *Salmonella paratyphi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 3629 *Pseudomonas aeruginosa* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 1537 *Pasteurella multocida* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 433 *Neisseria gonorrhoeae* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 2112 *Mycobacterium tuberculosis* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 2171 *Mycobacterium lepraesp*Q9X7C7 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 3561 *Mycobacterium bovis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 2306 *Klebsiella pneumoniae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 7322 *Klebsiella pneumoniae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 673 *Helicobacter pylori* HP1279 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 1189 *Helicobacter pylori* J99sp|Q9ZJU8 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 6522 *Haemophilus influenzae*gij1574224|sp|P46451|TRPC_HAEIN INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)

4_1_1_48 4843 *Escherichia coli* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 1802 *Corynebacterium diphtheriae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 2135 *Corynebacterium diphtheriae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_48 2031 *Clostridium acetobutylicum* 25412825_F2_5 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 559 *Campylobacter jejuni* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 1469 *Bordetella pertussis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 7524 *Bordetella bronchiseptica* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_48 2262 *Bacillus subtilis* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48)
 4_1_1_49 6832 *Yersinia pseudotuberculosis* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 1439 *Yersinia pestis* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 6484 *Vibrio cholerae* El Tor N16961 ORF03469 PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 2060 *Streptococcus mutans* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 173 *Staphylococcus aureus* sp|P51065 PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 5351 *Salmonella typhimurium* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 1007 *Salmonella typhi* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 908 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 3313 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 3315 *Salmonella paratyphi* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 2153 *Salmonella enteritidis* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 4302 *Salmonella dublin* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 5478 *Saccharomyces cerevisiae* PCK1 PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 5220 *Pseudomonas aeruginosa* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 750 *Porphyromonas gingivalis* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 1000 *Pasteurella multocida* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 20565 *Neurospora crassa* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 5601 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 8614 *Klebsiella pneumoniae* PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 16549 *Haemophilus influenzae* HI0809 PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 875 *Haemophilus ducreyi* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 3321 *Escherichia coli* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 2554 *Enterococcus faecium* (DOE) EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 1897 *Campylobacter jejuni* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_49 3050 *Bacillus subtilis* pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_5 5395 *Vibrio cholerae* El Tor N16961 ORF02026 ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 1214 *Streptococcus mutans* ALPHA-ACETOLACTATE DECARBOXYLASE PRECURSOR (EC 4_1_1_5)
 4_1_1_5 2815 *Staphylococcus aureus* ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 3189 *Staphylococcus aureus* BS-alsD ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 6871 *Klebsiella pneumoniae* ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 6872 *Klebsiella pneumoniae* ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 2212 *Enterococcus faecium* (DOE) ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 2236 *Enterococcus faecalis* BS-alsD ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 815 *Corynebacterium diphtheriae* ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)

4_1_1_5 1109 *Clostridium acetobutylicum* 5117192_C2_69 ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_5 3595 *Bacillus subtilis* alsD ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_55 3306 *Bordetella pertussis* 4,5-DIHYDROXYPHTHALATE DECARBOXYLASE (EC 4_1_1_55)
 4_1_1_55 6711 *Bordetella bronchiseptica* 4,5-DIHYDROXYPHTHALATE DECARBOXYLASE (EC 4_1_1_55)
 4_1_1_61 365 *Bacillus subtilis* ylcC 4-HYDROXYBENZOATE DECARBOXYLASE (EC 4_1_1_61)
 4_1_1_7 5394 *Pseudomonas aeruginosa* mdIC BENZOYLFORMATE DECARBOXYLASE (EC 4_1_1_7)
 4_1_1_71 8096 *Yersinia pseudotuberculosis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 2271 *Yersinia pestis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1103 *Staphylococcus aureus* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 5176 *Salmonella typhi* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1817 *Salmonella paratyphi* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 96 *Porphyromonas gingivalis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 965 *Pasteurella multocida* menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 3276 *Mycobacterium tuberculosis* menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 3303 *Mycobacterium leprae* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 435 *Mycobacterium bovis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1475 *Klebsiella pneumoniae* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1476 *Klebsiella pneumoniae* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1477 *Klebsiella pneumoniae* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 1478 *Klebsiella pneumoniae* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 14027 *Haemophilus influenzae* HI0283 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 406 *Haemophilus ducreyi* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 5372 *Escherichia coli* menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 2539 *Enterococcus faecalis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 868 *Corynebacterium diphtheriae* 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_71 3076 *Bacillus subtilis* menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_74 1692 *Staphylococcus aureus* EC-ilvB INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 6069 *Salmonella typhimurium* ipdC INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 2670 *Salmonella typhi* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 705 *Salmonella paratyphi* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 706 *Salmonella paratyphi* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 1536 *Salmonella enteritidis* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 1957 *Salmonella dublin* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 4530 *Mycobacterium tuberculosis* pdc INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 935 *Mycobacterium bovis* EC-ilvB INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 2274 *Klebsiella pneumoniae* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 2275 *Klebsiella pneumoniae* INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_74 399 *Clostridium acetobutylicum* 6645278_F2_34 INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_8 5464 *Mycobacterium tuberculosis* oxaA OXALYL-COA DECARBOXYLASE (EC 4_1_1_8)
 4_1_1_8 357 *Mycobacterium bovis* OXALYL-COA DECARBOXYLASE (EC 4_1_1_8)

4_1_1_8 5446 *Escherichia coli* b2373 OXALYL-COA DECARBOXYLASE (EC 4_1_1_8)
 4_1_1_9 7781 *Pseudomonas aeruginosa* mdcA malonate CoA-transferase (EC 2_8_3_3) / malonyl-CoA decarboxylase (EC 4_1_1_9)
 4_1_1_9 30 *Mycobacterium tuberculosis* Rv1347c MALONYL-COA DECARBOXYLASE (EC 4_1_1_9)
 4_1_1_9 1615 *Mycobacterium bovis* MALONYL-COA DECARBOXYLASE (EC 4_1_1_9)
 4_1_1_9 4215 *Bordetella pertussis* MALONYL-COA DECARBOXYLASE PRECURSOR (EC 4_1_1_9)
 4_1_1_9 5060 *Bordetella bronchiseptica* MALONYL-COA DECARBOXYLASE PRECURSOR (EC 4_1_1_9)
 4_1_2_14 6410 *Yersinia pseudotuberculosis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 214 *Yersinia pestis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 4161 *Vibrio cholerae* El Tor N16961 ORF00404 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 65 *Treponema pallidum* TP0568 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 446 *Streptococcus pyogenes* kgdA 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 724 *Streptococcus pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1101 *Streptococcus equi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1360 *Salmonella typhimurium* kdgA 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 5497 *Salmonella typhimurium* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 5843 *Salmonella typhimurium* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 4115 *Salmonella typhi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 5101 *Salmonella typhi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2241 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2242 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2243 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 3815 *Salmonella enteritidis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 4109 *Salmonella enteritidis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 3628 *Salmonella dublin* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1087 *Pseudomonas aeruginosa* PA3131 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 8418 *Pseudomonas aeruginosa* PA3181 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1740 *Pasteurella multocida* cda 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 277 *Neisseria gonorrhoeae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 5072 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 6953 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 7195 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 7843 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 500 *Helicobacter pylori* HP1099 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)

4_1_2_14 1015 *Helicobacter pylori* J99n[Q9ZKB4 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 14548 *Haemophilus influenzae* HI0047 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 5133 *Escherichia coli* eda 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2271 *Enterococcus faecium* (DOE) 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2301 *Enterococcus faecium* (DOE) 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 79 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 393 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 831 *Enterococcus faecalis* PUTATIVE 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1306 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1071 *Clostridium difficile* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 297 *Clostridium acetobutylicum* 19572687_C2_88 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 1115 *Clostridium acetobutylicum* 34181562_C3_79 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_14 2207 *Bacillus subtilis* kdga 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_15 5531 *Yersinia pseudotuberculosis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 6917 *Yersinia pseudotuberculosis* EC-aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 7959 *Yersinia pseudotuberculosis* EC-aroH PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 320 *Yersinia pestis* EC-aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 4326 *Yersinia pestis* EC-aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 4724 *Yersinia pestis* EC-aroH PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 4553 *Vibrio cholerae* El Tor N16961 ORF00939 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 5319 *Vibrio cholerae* El Tor N16961 ORF01927 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 7536 *Vibrio cholerae* El Tor N16961 ORFA00805 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 1076 *Streptococcus pyogenes* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 965 *Streptococcus pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 966 *Streptococcus pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 1257 *Streptococcus mutans* EC-aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 443 *Streptococcus equi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 2048 *Staphylococcus aureus* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 1972 *Salmonella typhimurium* aroH PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 3911 *Salmonella typhimurium* aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 4140 *Salmonella typhimurium* aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)

4_1_2_15 961 *Salmonella typhi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 3475 *Salmonella typhi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 5804 *Salmonella typhi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 2333 *Salmonella paratyphi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 2694 *Salmonella paratyphi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 2695 *Salmonella paratyphi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 3203 *Salmonella paratyphi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 1291 *Salmonella enteritidis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 2537 *Salmonella enteritidis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 3844 *Salmonella dublin* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 1644 *Saccharomyces cerevisiae* ARO3 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHENYLALANINE-INHIBITED (EC 4_1_2_15)
 4_1_2_15 8655 *Saccharomyces cerevisiae* ARO4 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 5102 *Pseudomonas aeruginosa* PA2943 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 6050 *Pseudomonas aeruginosa* PA2843 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 7298 *Pseudomonas aeruginosa* PA1750 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 8293 *Pseudomonas aeruginosa* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 400 *Porphyromonas gingivalis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 319 *Pasteurella multocida* aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 1600 *Pasteurella multocida* aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 802 *Neisseria gonorrhoeae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 1286 *Neisseria gonorrhoeae* EC-aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 4505 *Mycobacterium tuberculosis* aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 526 *Mycobacterium lepraetr* O69569 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 368 *Mycobacterium bovis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 3058 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 3059 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 3060 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 6421 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 6423 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 6424 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 7337 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)

4_1_2_15 7338 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 7339 *Klebsiella pneumoniae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 1088 *Helicobacter pylori* HP0134 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 125 *Helicobacter pylori* J99trJQ9ZMU5 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 15004 *Haemophilus influenzae* HI1547 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 763 *Haemophilus ducreyi* EC-aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 956 *Haemophilus ducreyi* EC-aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 721 *Escherichia coli* aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 1661 *Escherichia coli* aroH PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TRP-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 5569 *Escherichia coli* aroF PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, TYR-SENSITIVE (EC 4_1_2_15)
 4_1_2_15 2436 *Enterococcus faecium* (DOE) PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 1359 *Enterococcus faecalis* BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 1266 *Corynebacterium diphtheriae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 1995 *Clostridium difficile* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 2421 *Clostridium difficile* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 1750 *Clostridium acetobutylicum* 954438_F2_8 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 363 *Chlamydia trachomatis* D/UW-3/Cx BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 270 *Chlamydia pneumoniae* AR39 CP0270 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 440 *Chlamydia pneumoniae* CWL029 BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_15 137 *Campylobacter jejuni* Cj0716 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 1573 *Bordetella pertussis* EC-aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 8494 *Bordetella bronchiseptica* EC-aroG PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15)
 4_1_2_15 2969 *Bacillus subtilis* aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 4_1_2_16 6231 *Yersinia pseudotuberculosis* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 1829 *Yersinia pestis* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 5962 *Vibrio cholerae* El Tor N16961 ORF02751 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 4078 *Salmonella typhimurium* kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 2152 *Salmonella typhi* 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 4666 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 61 *Rickettsia prowazekii* RP062 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_16 8051 *Pseudomonas aeruginosa* kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)

4_1_2_16 1570 *Porphyromonas gingivalis* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE
 ALDOLASE (EC 4_1_2_16)
 4_1_2_16 324 *Pasteurella multocida* kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 1665 *Neisseria gonorrhoeae* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE
 (EC 4_1_2_16)
 4_1_2_16 3438 *Klebsiella pneumoniae* 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 969 *Helicobacter pylori* HP0003 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 3 *Helicobacter pylori* J99sp|Q9ZN55 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE
 (EC 4_1_2_16)
 4_1_2_16 11308 *Haemophilus influenzae* HI1557 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE
 (EC 4_1_2_16)
 4_1_2_16 271 *Haemophilus ducreyi* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 1177 *Escherichia coli* kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 626 *Chlamydia trachomatis* D/UW-3/Cx EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE
 ALDOLASE (EC 4_1_2_16)
 4_1_2_16 25 *Chlamydia pneumoniae* AR39 CP0025 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE
 ALDOLASE (EC 4_1_2_16)
 4_1_2_16 664 *Chlamydia pneumoniae* CWL029 EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE
 ALDOLASE (EC 4_1_2_16)
 4_1_2_16 2385 *Campylobacter jejuni* kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 1063 *Bordetella pertussis* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC
 4_1_2_16)
 4_1_2_16 6011 *Bordetella bronchiseptica* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE
 ALDOLASE (EC 4_1_2_16)
 4_1_2_17 6744 *Yersinia pseudotuberculosis* BS-ykrY L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 7683 *Yersinia pseudotuberculosis* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3536 *Yersinia pestis* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 1527 *Streptococcus pneumoniae* EC-fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3729 *Salmonella typhimurium* ygbL L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 5533 *Salmonella typhimurium* prd L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3718 *Salmonella typhi* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3851 *Salmonella typhi* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3829 *Salmonella paratyphi* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 5997 *Salmonella paratyphi* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 2207 *Salmonella enteritidis* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3947 *Salmonella enteritidis* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3825 *Salmonella dublin* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 985 *Pseudomonas aeruginosa* PA1683 L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 5307 *Pseudomonas aeruginosa* PA0224 L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 333 *Pasteurella multocida* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 393 *Mycobacterium tuberculosis* fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 2434 *Mycobacterium leprae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 2730 *Mycobacterium bovis* EC-fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 4048 *Klebsiella pneumoniae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 4147 *Klebsiella pneumoniae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 4405 *Klebsiella pneumoniae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 6986 *Klebsiella pneumoniae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 6987 *Klebsiella pneumoniae* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 5748 *Haemophilus influenzae* HI1012 L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 17016 *Haemophilus influenzae* HI0611 L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 2667 *Escherichia coli* b2738 L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 5667 *Escherichia coli* fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 2219 *Clostridium difficile* L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 3619 *Bordetella pertussis* EC-fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 6805 *Bordetella bronchiseptica* EC-fucA L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_17 1362 *Bacillus subtilis* ykrY L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)

- 4_1_2_19 7795 *Yersinia pseudotuberculosis* EC-rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 412 *Yersinia pestis* EC-rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 2637 *Salmonella typhimurium* rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 3302 *Salmonella typhi* RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 414 *Salmonella paratyphi* RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 1095 *Salmonella enteritidis* RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 2235 *Salmonella dublin* RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 8729 *Klebsiella pneumoniae* RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 6240 *Escherichia coli* rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 3547 *Enterococcus faecium* (DOE) RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_19 1295 *Enterococcus faecalis* EC-rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
- 4_1_2_20 4593 *Salmonella typhimurium* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_20 1544 *Salmonella typhi* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_20 5792 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_20 3848 *Salmonella enteritidis* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_20 3079 *Klebsiella pneumoniae* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_20 5841 *Escherichia coli* yhaF 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
- 4_1_2_21 110 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21) / GALACTONATE DEHYDRATASE (EC 4_2_1_6)
- 4_1_2_21 111 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21)
- 4_1_2_21 6545 *Escherichia coli* yidU 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21) / GALACTONATE DEHYDRATASE (EC 4_2_1_6)
- 4_1_2_25 3510 *Yersinia pestis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 4390 *Vibrio cholerae* El Tor N16961 ORF00733 DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 944 *Streptococcus pyogenes* folQ DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 612 *Streptococcus pneumoniae* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3) / DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2513 *Staphylococcus aureus* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2013 *Salmonella typhimurium* folB DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 149 *Salmonella typhi* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2135 *Salmonella paratyphi* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 3310 *Salmonella enteritidis* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 3074 *Salmonella dublin* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2504 *Pseudomonas aeruginosa* folB DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1273 *Porphyromonas gingivalis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1066 *Pasteurella multocida* folB DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 234 *Neisseria gonorrhoeae* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2977 *Mycobacterium tuberculosis* folX DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 3074 *Mycobacterium leprae* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 3971 *Mycobacterium bovis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 4840 *Klebsiella pneumoniae* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 4841 *Klebsiella pneumoniae* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 890 *Helicobacter pylori* HP1510 DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1390 *Helicobacter pylori* J99tr|Q9ZJB0 DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 14065 *Haemophilus influenzae* tr|G3212189 DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 367 *Haemophilus ducreyi* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 5812 *Escherichia coli* ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1277 *Enterococcus faecalis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 483 *Corynebacterium diphtheriae* DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1997 *Clostridium difficile* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 986 *Clostridium acetobutylicum* 23626540_C2_46 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3) / DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 585 *Chlamydia trachomatis* D/UW-3/Cx folX DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 1115 *Chlamydia pneumoniae* AR39 CP1115 DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 695 *Chlamydia pneumoniae* CWL029 folX DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 3000 *Campylobacter jejuni* Cj0356c DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 2920 *Bordetella pertussis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
- 4_1_2_25 7054 *Bordetella bronchiseptica* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)

4_1_2_25 78 *Bacillus subtilis* folA DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
 4_1_2_29 3960 *Bacillus subtilis* iolJ 5-DEHYDRO-2-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_29)
 4_1_2_40 421 *Streptococcus pyogenes* lacD_1 TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 611 *Streptococcus pyogenes* lacD_2 TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 138 *Streptococcus pneumoniae* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 752 *Streptococcus mutans* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 1093 *Streptococcus mutans* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 593 *Streptococcus equi* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 2823 *Staphylococcus aureus* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 4673 *Salmonella typhi* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 4295 *Salmonella enteritidis* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 2692 *Enterococcus faecium* (DOE) TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 354 *Enterococcus faecalis* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_40 2228 *Enterococcus faecalis* TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_5 2794 *Staphylococcus aureus* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 1247 *Salmonella typhi* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 6191 *Saccharomyces cerevisiae* GLY1 LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 931 *Pseudomonas aeruginosa* ltaA LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 310 *Porphyromonas gingivalis* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 1516 *Klebsiella pneumoniae* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 4670 *Escherichia coli* b0870 LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 12 *Clostridium acetobutylicum* 36335840_F1_16 LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_2_5 2247 *Bordetella pertussis* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_3_1 7359 *Yersinia pseudotuberculosis* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 3554 *Yersinia pestis* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 4591 *Vibrio cholerae* El Tor N16961 ORF00992 ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1226 *Salmonella typhimurium* aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 528 *Salmonella typhi* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 6229 *Salmonella paratyphi* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1182 *Salmonella enteritidis* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 738 *Salmonella dublin* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2432 *Saccharomyces cerevisiae* ICL2 ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 3914 *Saccharomyces cerevisiae* ICL1 ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 4897 *Pseudomonas aeruginosa* PA2634 ISOCITRATE LYASE 1 (EC 4_1_3_1)
 4_1_3_1 63 *Neurospora crassa* acu-3 ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 3368 *Mycobacterium tuberculosis* aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 4041 *Mycobacterium tuberculosis* aceAb ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 5766 *Mycobacterium tuberculosis* aceAa ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1029 *Mycobacterium leprae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2408 *Mycobacterium leprae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2409 *Mycobacterium leprae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2410 *Mycobacterium leprae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2411 *Mycobacterium leprae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 702 *Mycobacterium bovis* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 703 *Mycobacterium bovis* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 2136 *Mycobacterium bovis* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1222 *Klebsiella pneumoniae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1550 *Klebsiella pneumoniae* ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 493 *Escherichia coli* b0510 ISOCITRATE LYASE 1 (EC 4_1_3_1)
 4_1_3_1 3901 *Escherichia coli* aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 1753 *Bordetella pertussis* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_1 7593 *Bordetella bronchiseptica* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_12 4182 *Yersinia pseudotuberculosis* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 5095 *Yersinia pseudotuberculosis* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3849 *Yersinia pestis* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 4731 *Yersinia pestis* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 6247 *Vibrio cholerae* El Tor N16961 ORF03146 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 358 *Streptococcus pneumoniae* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1050 *Streptococcus mutans* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1198 *Staphylococcus aureus* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)

4_1_3_12 2790 *Staphylococcus aureus* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 995 *Salmonella typhimurium* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1677 *Salmonella typhi* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3571 *Salmonella paratyphi* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3572 *Salmonella paratyphi* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 183 *Saccharomyces cerevisiae* LYS20 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3023 *Saccharomyces cerevisiae* LEU4 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 6771 *Saccharomyces cerevisiae* YOR108W 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 7705 *Saccharomyces cerevisiae* LYS21 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3621 *Pseudomonas aeruginosa* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 6448 *Pseudomonas aeruginosa* PA1217 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1213 *Pasteurella multocida* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 993 *Neisseria gonorrhoeae* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 4371 *Mycobacterium tuberculosis* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 2367 *Mycobacterium leprae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 74 *Mycobacterium bovis* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 4248 *Klebsiella pneumoniae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 4249 *Klebsiella pneumoniae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 5177 *Klebsiella pneumoniae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 5179 *Klebsiella pneumoniae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 5686 *Haemophilus influenzae* HI0986 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 4321 *Escherichia coli* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 129 *Corynebacterium diphtheriae* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 550 *Clostridium difficile* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1680 *Clostridium acetobutylicum* 24265967_C2_41 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1711 *Clostridium acetobutylicum* 49092_C1_27 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 2237 *Clostridium acetobutylicum* 1364025_C2_25 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3976 *Clostridium acetobutylicum* 23602165_C2_4 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 1071 *Campylobacter jejuni* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 2611 *Bordetella pertussis* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 3080 *Bordetella pertussis* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 5502 *Bordetella bronchiseptica* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 6737 *Bordetella bronchiseptica* 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_12 2822 *Bacillus subtilis* leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_16 6410 *Yersinia pseudotuberculosis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 214 *Yersinia pestis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 4161 *Vibrio cholerae* El Tor N16961 ORF00404 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 65 *Treponema pallidum* TP0568 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 446 *Streptococcus pyogenes* kgdA 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 724 *Streptococcus pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1101 *Streptococcus equi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1360 *Salmonella typhimurium* kgdA 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 5497 *Salmonella typhimurium* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 5843 *Salmonella typhimurium* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 4115 *Salmonella typhi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 5101 *Salmonella typhi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)

4_1_3_16 2241 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 2242 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 2243 *Salmonella paratyphi* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 3815 *Salmonella enteritidis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 4109 *Salmonella enteritidis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 3628 *Salmonella dublin* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1087 *Pseudomonas aeruginosa* PA3131 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 8418 *Pseudomonas aeruginosa* PA3181 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1740 *Pasteurella multocida* eda 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 277 *Neisseria gonorrhoeae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 5072 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 6953 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 7195 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 7843 *Klebsiella pneumoniae* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 500 *Helicobacter pylori* HP1099 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1015 *Helicobacter pylori* J99trQ9ZKB4 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 14548 *Haemophilus influenzae* HI0047 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 5133 *Escherichia coli* eda 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 2271 *Enterococcus faecium* (DOE) 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 2301 *Enterococcus faecium* (DOE) 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 79 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 393 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 831 *Enterococcus faecalis* PUTATIVE 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1306 *Enterococcus faecalis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1071 *Clostridium difficile* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 297 *Clostridium acetobutylicum* 19572687_C2_88 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 1115 *Clostridium acetobutylicum* 34181562_C3_79 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_16 2207 *Bacillus subtilis* kdgA 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_19 1019 *Trponema pallidum* TP0562 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 1131 *Helicobacter pylori* HP0178 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 170 *Helicobacter pylori* J99trQ9ZMQ2 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 1738 *Enterococcus faecium* (DOE) N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 1329 *Clostridium acetobutylicum* 24433467_C1_46 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)

4_1_3_19 2713 *Campylobacter jejuni* neuB3 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 2893 *Campylobacter jejuni* neuB1 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 2934 *Campylobacter jejuni* neuB2 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_19 3780 *Bacillus subtilis* spsE N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_2 7360 *Yersinia pseudotuberculosis* EC-aceB MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 903 *Yersinia pestis* EC-aceB MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 4589 *Vibrio cholerae* El Tor N16961 ORF00990 MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 1227 *Salmonella typhimurium* mas MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 4448 *Salmonella typhi* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 6227 *Salmonella paratyphi* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 6228 *Salmonella paratyphi* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 3519 *Salmonella enteritidis* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 737 *Salmonella dublin* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 6774 *Saccharomyces cerevisiae* DAL7 MALATE SYNTHASE 2, GLYOXYSOMAL (EC 4_1_3_2)
 4_1_3_2 6809 *Saccharomyces cerevisiae* MLS1 MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 593 *Pseudomonas aeruginosa* glcB MALATE SYNTHASE (EC 4_1_3_2)
 4_1_3_2 66 *Neurospora crassa* acu-9 MALATE SYNTHASE, GLYOXYSOMAL (EC 4_1_3_2)
 4_1_3_2 285 *Mycobacterium tuberculosis* glcB MALATE SYNTHASE (EC 4_1_3_2)
 4_1_3_2 3430 *Mycobacterium leprae* EC-glcB PROBABLE MALATE SYNTHASE (EC 4_1_3_2)
 4_1_3_2 2609 *Mycobacterium bovis* EC-glcB MALATE SYNTHASE (EC 4_1_3_2)
 4_1_3_2 1168 *Klebsiella pneumoniae* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 1169 *Klebsiella pneumoniae* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 1224 *Klebsiella pneumoniae* MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 3900 *Escherichia coli* aceB MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_2 5763 *Escherichia coli* glcB MALATE SYNTHASE G (EC 4_1_3_2)
 4_1_3_2 4391 *Bordetella pertussis* EC-glcB MALATE SYNTHASE (EC 4_1_3_2)
 4_1_3_2 6687 *Bordetella bronchiseptica* PROBABLE MALATE SYNTHASE G (EC 4_1_3_2)
 4_1_3_21 1649 *Clostridium acetobutylicum* 4775328_C2_27 HOMOCITRATE SYNTHASE, OMEGA SUBUNIT (EC 4_1_3_21)
 4_1_3_21 3588 *Clostridium acetobutylicum* 6835963_C3_7 HOMOCITRATE SYNTHASE, ALPHA SUBUNIT (EC 4_1_3_21)
 4_1_3_21 3589 *Clostridium acetobutylicum* 9773962_C2_5' HOMOCITRATE SYNTHASE, OMEGA SUBUNIT (EC 4_1_3_21)
 4_1_3_27 199 *Yersinia pseudotuberculosis* EC-trpE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 6368 *Yersinia pseudotuberculosis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 6734 *Yersinia pseudotuberculosis* EC-trpD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 6855 *Yersinia pseudotuberculosis* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 8216 *Yersinia pseudotuberculosis* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 961 *Yersinia pestis* trpQ9Z396 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2464 *Yersinia pestis* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2570 *Yersinia pestis* EC-trpD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2571 *Yersinia pestis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2572 *Yersinia pestis* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 4999 *Vibrio cholerae* El Tor N16961 ORF01525 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 5000 *Vibrio cholerae* El Tor N16961 ORF01526 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 6368 *Vibrio cholerae* El Tor N16961 ORF03313 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 504 *Streptococcus pyogenes* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1028 *Streptococcus pyogenes* trpG PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 767 *Streptococcus pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)

4_1_3_27 1392 *Streptococcus pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1503 *Streptococcus pneumoniae* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 1504 *Streptococcus pneumoniae* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 1764 *Streptococcus pneumoniae* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 252 *Streptococcus mutans* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 970 *Streptococcus mutans* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1227 *Streptococcus mutans* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1752 *Streptococcus mutans* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 793 *Streptococcus equi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2493 *Staphylococcus aureus* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2749 *Staphylococcus aureus* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 3400 *Staphylococcus aureus* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 3401 *Staphylococcus aureus* trpE ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 858 *Salmonella typhimurium* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 859 *Salmonella typhimurium* trpGD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3998 *Salmonella typhimurium* pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 1035 *Salmonella typhi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 1037 *Salmonella typhi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3410 *Salmonella typhi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2879 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2881 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2882 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2883 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2884 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2885 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2886 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2887 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2888 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 4839 *Salmonella paratyphi* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2434 *Salmonella enteritidis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3775 *Salmonella enteritidis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3776 *Salmonella enteritidis* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 3893 *Salmonella dublin* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 3895 *Salmonella dublin* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 5990 *Saccharomyces cerevisiae* TRP3 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 6124 *Saccharomyces cerevisiae* TRP2 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 395 *Rickettsia prowazekii* RP404 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 298 *Pseudomonas aeruginosa* phnA ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 299 *Pseudomonas aeruginosa* phnB ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3667 *Pseudomonas aeruginosa* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)

4_1_3_27 6418 *Pseudomonas aeruginosa* trpG ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) /
 PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 8011 *Pseudomonas aeruginosa* PA0297 ANTHRANILATE SYNTHASE COMPONENT II (EC
 4_1_3_27)
 4_1_3_27 327 *Porphyromonas gingivalis* PARA-AMINOBENZOATE SYNTHASE COMPONENT I (EC 4_1_3_-)
 / ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 1734 *Porphyromonas gingivalis* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC
 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II
 (EC 4_1_3_-)
 4_1_3_27 369 *Pasteurella multocida* trpG_2 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) /
 PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 371 *Pasteurella multocida* PARA-AMINOBENZOATE SYNTHASE COMPONENT I (EC 4_1_3_-) /
 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 1540 *Pasteurella multocida* trpG_1 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) /
 PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 1541 *Pasteurella multocida* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 968 *Neisseria gonorrhoeae* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 1449 *Neisseria gonorrhoeae* sp|Q9WW00 ANTHRANILATE SYNTHASE COMPONENT I (EC
 4_1_3_27)
 4_1_3_27 72 *Mycobacterium tuberculosis* pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 596 *Mycobacterium tuberculosis* trpE2 ANTHRANILATE SYNTHASE COMPONENT I (EC
 4_1_3_27)
 4_1_3_27 2116 *Mycobacterium tuberculosis* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC
 4_1_3_27)
 4_1_3_27 4216 *Mycobacterium tuberculosis* Rv2859c ANTHRANILATE SYNTHASE COMPONENT II (EC
 4_1_3_27)
 4_1_3_27 761 *Mycobacterium leprae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1472 *Mycobacterium leprae* trjQ50183 ANTHRANILATE SYNTHASE COMPONENT II (EC
 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II
 (EC 4_1_3_-)
 4_1_3_27 2925 *Mycobacterium leprae* sp|Q9X7C5 ANTHRANILATE SYNTHASE COMPONENT I (EC
 4_1_3_27)
 4_1_3_27 451 *Mycobacterium bovis* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2432 *Mycobacterium bovis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2499 *Mycobacterium bovis* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 3452 *Mycobacterium bovis* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 2307 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2308 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2309 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2310 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2311 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 6347 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) /
 PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 6836 *Klebsiella pneumoniae* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 675 *Helicobacter pylori* HP1281 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) /
 PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC
 4_1_3_-)
 4_1_3_27 676 *Helicobacter pylori* HP1282 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 1731 *Helicobacter pylori* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 1190 *Helicobacter pylori* J99sp|Q9ZJU7 ANTHRANILATE SYNTHASE COMPONENT II (EC
 4_1_3_27)

4_1_3_27 1191 *Helicobacter pylori* J99tr|Q9ZJU6 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 1192 *Helicobacter pylori* J99sp|Q9ZJU5 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2504 *Haemophilus influenzae* H1171 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2923 *Haemophilus influenzae* H11388 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 10186 *Haemophilus influenzae* H11387 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 788 *Haemophilus ducreyi* PARA-AMINOBENZOATE SYNTHASE COMPONENT I (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 791 *Haemophilus ducreyi* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 1258 *Escherichia coli* b1298 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 4844 *Escherichia coli* trpD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) [INCLUDES: GLUTAMINE AMIDOTRANSFERASE; ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)]
 4_1_3_27 4845 *Escherichia coli* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 5967 *Escherichia coli* pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2186 *Enterococcus faecalis* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2132 *Corynebacterium diphtheriae* ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2133 *Corynebacterium diphtheriae* PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2002 *Clostridium difficile* EC-pabB PARA-AMINOBENZOATE SYNTHASE COMPONENT I (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2003 *Clostridium difficile* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3032 *Clostridium difficile* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 3494 *Clostridium difficile* ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2028 *Clostridium acetobutylicum* 29563962_F1_2 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2029 *Clostridium acetobutylicum* 4687828_F1_3 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2495 *Clostridium acetobutylicum* 34272142_C3_23 ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 3983 *Clostridium acetobutylicum* 24859412_C3_3 ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 336 *Campylobacter jejuni* pabB PARA-AMINOBENZOATE SYNTHASE COMPONENT I (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 338 *Campylobacter jejuni* pabA PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-) / ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27)
 4_1_3_27 2325 *Campylobacter jejuni* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 2326 *Campylobacter jejuni* trpD ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 3233 *Bordetella pertussis* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 3234 *Bordetella pertussis* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 7526 *Bordetella bronchiseptica* EC-pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)

4_1_3_27 7527 *Bordetella bronchiseptica* EC-entC ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_27 75 *Bacillus subtilis* pabA ANTHRANILATE SYNTHASE COMPONENT II (EC 4_1_3_27) / PARA-AMINOBENZOATE SYNTHASE GLUTAMINE AMIDOTRANSFERASE COMPONENT II (EC 4_1_3_-)
 4_1_3_27 2264 *Bacillus subtilis* trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_3 6064 *Yersinia pseudotuberculosis* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 3903 *Yersinia pestis* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 5573 *Vibrio cholerae* El Tor N16961 ORF02257 N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 993 *Streptococcus pyogenes* nanH N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 116 *Streptococcus pneumoniae* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 117 *Streptococcus pneumoniae* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 425 *Streptococcus pneumoniae* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 1162 *Streptococcus equi* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 1742 *Staphylococcus aureus* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 6112 *Salmonella typhimurium* npl N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 4620 *Salmonella typhi* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 1253 *Salmonella paratyphi* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 1263 *Salmonella enteritidis* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 1084 *Pasteurella multocida* nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 14343 *Haemophilus influenzae* HI0142 N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 408 *Haemophilus ducreyi* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 5887 *Escherichia coli* nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_3 3723 *Clostridium difficile* N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_30 5161 *Vibrio cholerae* El Tor N16961 ORF01725 methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 234 *Salmonella typhimurium* prpB methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 1730 *Salmonella typhi* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 3664 *Salmonella paratyphi* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 2850 *Salmonella enteritidis* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 3783 *Pseudomonas aeruginosa* PA4872 methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 5197 *Pseudomonas aeruginosa* prpB methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 6254 *Pseudomonas aeruginosa* PA3682 methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 1609 *Neisseria gonorrhoeae* BS-yqiQ methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 950 *Mycobacterium tuberculosis* Rv1998c methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 1478 *Mycobacterium bovis* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 315 *Escherichia coli* b0331 methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 1087 *Bordetella pertussis* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 2491 *Bordetella pertussis* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 6693 *Bordetella bronchiseptica* methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 2810 *Bordetella bronchiseptica* BS-yqiQ methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_30 2407 *Bacillus subtilis* yqiQ methylisocitrate lyase (EC 4_1_3_30)
 4_1_3_31 119 *Yersinia pestis* EC-gltA 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 5162 *Vibrio cholerae* El Tor N16961 ORF01726 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 1729 *Salmonella typhi* 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 3663 *Salmonella paratyphi* 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 5198 *Pseudomonas aeruginosa* prpC 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 1611 *Neisseria gonorrhoeae* 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 5645 *Mycobacterium tuberculosis* gltA1 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 954 *Mycobacterium bovis* BS-citZ 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 317 *Escherichia coli* b0333 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 1086 *Bordetella pertussis* BS-citZ 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_31 8811 *Bordetella bronchiseptica* 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_34 287 *Streptococcus pyogenes* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 917 *Streptococcus mutans* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 696 *Streptococcus equi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 3633 *Salmonella typhimurium* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)

4_1_3_34 2134 *Salmonella typhi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 2522 *Salmonella paratyphi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 118 *Klebsiella pneumoniae* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 21806 *Haemophilus influenzae* HI0023 CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 628 *Haemophilus ducreyi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 4550 *Escherichia coli* b0616 CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_34 1016 *Enterococcus faecalis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_36 8098 *Yersinia pseudotuberculosis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 2269 *Yersinia pestis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 5768 *Vibrio cholerae* El Tor N16961 ORF02490 NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 3007 *Staphylococcus aureus* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 4351 *Salmonella typhimurium* menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 5173 *Salmonella typhi* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 6473 *Salmonella paratyphi* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 1108 *Salmonella dublin* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 95 *Porphyromonas gingivalis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 1815 *Pasteurella multocida* menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 1367 *Mycobacterium tuberculosis* echA13 NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 2374 *Mycobacterium tuberculosis* menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 1738 *Mycobacterium leprae* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 1113 *Mycobacterium bovis* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 2653 *Mycobacterium bovis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 3690 *Klebsiella pneumoniae* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 3691 *Klebsiella pneumoniae* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 5652 *Haemophilus influenzae* HI0968 NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 43 *Haemophilus ducreyi* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 5370 *Escherichia coli* menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 2536 *Enterococcus faecalis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 2346 *Corynebacterium diphtheriae* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 4409 *Bordetella pertussis* O30448 NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 8125 *Bordetella bronchiseptica* NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 988 *Bacillus subtilis* yhaR NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_36 3074 *Bacillus subtilis* menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_6 6671 *Yersinia pseudotuberculosis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 4345 *Yersinia pestis* O9ZC38 CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 4653 *Vibrio cholerae* El Tor N16961 ORF01070 CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 4654 *Vibrio cholerae* El Tor N16961 ORF01071 CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 287 *Streptococcus pyogenes* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 288 *Streptococcus pyogenes* citF CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 917 *Streptococcus mutans* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 918 *Streptococcus mutans* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 694 *Streptococcus equi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 696 *Streptococcus equi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 2196 *Salmonella typhimurium* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 3273 *Salmonella typhimurium* citF CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 3275 *Salmonella typhimurium* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 3633 *Salmonella typhimurium* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 3635 *Salmonella typhimurium* citF CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 162 *Salmonella typhi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 348 *Salmonella typhi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 1898 *Salmonella typhi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)

4_1_3_6 2134 *Salmonella typhi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 95 *Salmonella paratyphi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 96 *Salmonella paratyphi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 97 *Salmonella paratyphi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 98 *Salmonella paratyphi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 317 *Salmonella paratyphi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 2522 *Salmonella paratyphi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 2937 *Salmonella paratyphi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 118 *Salmonella enteritidis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 2387 *Salmonella enteritidis* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 2469 *Salmonella enteritidis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 2470 *Salmonella enteritidis* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 3790 *Salmonella enteritidis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 3083 *Salmonella dublin* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 3104 *Salmonella dublin* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 3105 *Salmonella dublin* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 6268 *Pseudomonas aeruginosa* PA0883 CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 522 *Mycobacterium tuberculosis* Rv3075c CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 4601 *Mycobacterium tuberculosis* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 1649 *Mycobacterium leprae* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 2914 *Mycobacterium bovis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 3678 *Mycobacterium bovis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 118 *Klebsiella pneumoniae* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 4726 *Klebsiella pneumoniae* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 4727 *Klebsiella pneumoniae* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 18181 *Haemophilus influenzae* HI0022 CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 21806 *Haemophilus influenzae* HI0023 CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 627 *Haemophilus ducreyi* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 628 *Haemophilus ducreyi* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 526 *Escherichia coli* b0544 CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 4549 *Escherichia coli* b0615 CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 4550 *Escherichia coli* b0616 CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 1016 *Enterococcus faecalis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_6 1017 *Enterococcus faecalis* CITRATE LYASE ALPHA CHAIN (EC 4_1_3_6)
 4_1_3_6 1987 *Enterococcus faecalis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 2268 *Corynebacterium diphtheriae* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 2310 *Bordetella pertussis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 5486 *Bordetella bronchiseptica* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 5759 *Bordetella bronchiseptica* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_6 7363 *Bordetella bronchiseptica* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_7 4686 *Yersinia pseudotuberculosis* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 5885 *Vibrio cholerae* El Tor N16961 ORF02639 CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 152 *Streptococcus mutans* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 2453 *Staphylococcus aureus* EC-gltA CITRATE SYNTHASE II (EC 4_1_3_7)
 4_1_3_7 87 *Salmonella typhimurium* gltA CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 1944 *Salmonella typhimurium* prpC POSSIBLE CITRATE SYNTHASE 2 (EC 4_1_3_7)
 4_1_3_7 4064 *Salmonella typhi* CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 62 *Salmonella paratyphi* CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 63 *Salmonella paratyphi* CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 64 *Salmonella paratyphi* CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 1817 *Salmonella enteritidis* CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_3_7 4559 *Saccharomyces cerevisiae* CIT1 CITRATE SYNTHASE, MITOCHONDRIAL PRECURSOR (EC 4_1_3_7)
 4_1_3_7 6602 *Saccharomyces cerevisiae* CIT2 CITRATE SYNTHASE, MITOCHONDRIAL PRECURSOR (EC 4_1_3_7)

- 4_1_3_7 6911 *Saccharomyces cerevisiae* CIT3 CITRATE SYNTHASE, MITOCHONDRIAL PRECURSOR (EC 4_1_3_7)
- 4_1_3_7 815 *Rickettsia prowazekii* RP844 CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 8103 *Pseudomonas aeruginosa* gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 406 *Pasteurella multocida* gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 111 *Neurospora crassa* cit1 CITRATE SYNTHASE, MITOCHONDRIAL PRECURSOR (EC 4_1_3_7)
- 4_1_3_7 841 *Neisseria gonorrhoeae* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 707 *Mycobacterium tuberculosis* citA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 4948 *Mycobacterium tuberculosis* gltA2 CITRATE SYNTHASE I (EC 4_1_3_7)
- 4_1_3_7 3309 *Mycobacterium leprae* trjO33066 CITRATE SYNTHASE I (EC 4_1_3_7)
- 4_1_3_7 3311 *Mycobacterium leprae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 3312 *Mycobacterium leprae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 3313 *Mycobacterium leprae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 1130 *Mycobacterium bovis* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 4080 *Mycobacterium bovis* BS-citA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 3505 *Klebsiella pneumoniae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 3506 *Klebsiella pneumoniae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 988 *Helicobacter pylori* HP0026 CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 22 *Helicobacter pylori* J99 gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 4608 *Escherichia coli* gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 1483 *Corynebacterium diphtheriae* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 502 *Campylobacter jejuni* gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 1095 *Bordetella pertussis* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 4022 *Bordetella pertussis* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 5551 *Bordetella bronchiseptica* CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 9152 *Bordetella bronchiseptica* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_3_7 943 *Bacillus subtilis* citA CITRATE SYNTHASE I (EC 4_1_3_7)
- 4_1_3_7 2409 *Bacillus subtilis* mmgD CITRATE SYNTHASE III (EC 4_1_3_7)
- 4_1_3_7 2908 *Bacillus subtilis* citZ CITRATE SYNTHASE (EC 4_1_3_7)
- 4_1_99_1 522 *Vibrio cholerae* El Tor N16961 ORF01101 TRYPTOPHANASE (EC 4_1_99_1)
- 4_1_99_1 1988 *Pasteurella multocida* tnaA TRYPTOPHANASE (EC 4_1_99_1)
- 4_1_99_1 3626 *Escherichia coli* tnaA TRYPTOPHANASE (EC 4_1_99_1)
- 4_1_99_2 456 *Porphyromonas gingivalis* TYROSINE PHENOL-LYASE (EC 4_1_99_2)
- 4_1_99_2 892 *Porphyromonas gingivalis* EC-tnaA TYROSINE PHENOL-LYASE (EC 4_1_99_2)
- 4_1_99_2 505 *Pasteurella multocida* TYROSINE PHENOL-LYASE (EC 4_1_99_2)
- 4_1_99_4 7712 *Yersinia pseudotuberculosis* PUTATIVE 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 127 *Yersinia pestis* 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 4628 *Salmonella typhimurium* yedO PUTATIVE 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 4425 *Salmonella typhi* 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 3978 *Salmonella paratyphi* 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 3979 *Salmonella paratyphi* PUTATIVE 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 4482 *Klebsiella pneumoniae* 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 5180 *Escherichia coli* b1919 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_1_99_4 9068 *Bordetella bronchiseptica* 1-AMINOCYCLOPROPANE-1-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
- 4_2_1_10 7491 *Yersinia pseudotuberculosis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 2957 *Yersinia pestis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 4173 *Vibrio cholerae* El Tor N16961 ORF00421 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 570 *Streptococcus pyogenes* aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 384 *Streptococcus pneumoniae* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 1622 *Streptococcus mutans* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 1447 *Streptococcus equi* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 2873 *Staphylococcus aureus* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
- 4_2_1_10 2024 *Salmonella typhimurium* aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)

4_2_1_10 1615 *Salmonella typhi* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 5490 *Salmonella paratyphi* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 4003 *Salmonella enteritidis* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1952 *Salmonella dublin* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 6725 *Pseudomonas aeruginosa* aroQ1 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 6802 *Pseudomonas aeruginosa* aroQ2 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1580 *Porphyromonas gingivalis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1812 *Pasteurella multocida* aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 244 *Neurospora crassa* qa-2 CATABOLIC 3-DEHYDROQUINASE (EC 4_2_1_10)
 4_2_1_10 252 *Neurospora crassa* CAA24237_1 CATABOLIC 3-DEHYDROQUINASE (EC 4_2_1_10)
 4_2_1_10 987 *Neisseria gonorrhoeae* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 136 *Mycobacterium tuberculosis* aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 443 *Mycobacterium leprae* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 3333 *Mycobacterium bovis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1254 *Klebsiella pneumoniae* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1255 *Klebsiella pneumoniae* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 443 *Helicobacter pylori* HP1038 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 388 *Helicobacter pylori* J99 aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 2063 *Haemophilus influenzae* HI0970 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1482 *Haemophilus ducreyi* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1650 *Escherichia coli* aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1019 *Enterococcus faecium* (DOE) 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1025 *Enterococcus faecalis* gi388110|sp|P36923|EBSD_ENTFA 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 744 *Corynebacterium diphtheriae* 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1356 *Clostridium difficile* EC-aroD 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1757 *Clostridium acetobutylicum* 24899217_F2_10 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1201 *Campylobacter jejuni* aroQ 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 1845 *Bordetella pertussis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 9466 *Bordetella bronchiseptica* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 2304 *Bacillus subtilis* aroC 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_10 2442 *Bacillus subtilis* yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_12 6871 *Yersinia pseudotuberculosis* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 3135 *Yersinia pestis* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 14164 *Vibrio cholerae* El Tor N16961 ORF00409 PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 1361 *Salmonella typhimurium* edd PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 2615 *Salmonella typhi* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 2244 *Salmonella paratyphi* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 2245 *Salmonella paratyphi* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 2246 *Salmonella paratyphi* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 2247 *Salmonella paratyphi* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 3929 *Salmonella enteritidis* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 4514 *Pseudomonas aeruginosa* edd PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 276 *Neisseria gonorrhoeae* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 7844 *Klebsiella pneumoniae* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 7846 *Klebsiella pneumoniae* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 501 *Helicobacter pylori* HP1100 PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 1016 *Helicobacter pylori* J99sp|Q9ZKB3 PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_12 5134 *Escherichia coli* edd PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_14 7381 *Vibrio cholerae* El Tor N16961ORFA00608 D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 5735 *Salmonella typhimurium* dsdA D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 3679 *Salmonella typhi* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 471 *Salmonella paratyphi* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 472 *Salmonella paratyphi* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 3951 *Salmonella dublin* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 179 *Pseudomonas aeruginosa* dsdA D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 3029 *Klebsiella pneumoniae* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 6945 *Klebsiella pneumoniae* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 6946 *Klebsiella pneumoniae* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 2314 *Escherichia coli* dsdA D-SERINE DEHYDRATASE (EC 4_2_1_14)

4_2_1_14 1104 *Clostridium difficile* D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_14 2373 *Bacillus subtilis* yqjR D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_16 4837 *Yersinia pseudotuberculosis* THREONINE DEHYDRATASE BIOSYNTHETIC PRECURSOR (EC 4_2_1_16)
 4_2_1_16 8030 *Yersinia pseudotuberculosis* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1958 *Yersinia pestis* EC-tdcB THREONINE DEHYDRATASE BIOSYNTHETIC PRECURSOR (EC 4_2_1_16)
 4_2_1_16 2919 *Yersinia pestis* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3911 *Vibrio cholerae* El Tor N16961 ORF00054 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 674 *Streptococcus pneumoniae* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 684 *Streptococcus mutans* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1298 *Staphylococcus aureus* EC-tdcB THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 1647 *Staphylococcus aureus* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1781 *Salmonella typhimurium* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3836 *Salmonella typhimurium* ygeX THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4585 *Salmonella typhimurium* tdcB THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 46 *Salmonella typhi* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 397 *Salmonella typhi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 2254 *Salmonella typhi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4878 *Salmonella typhi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1721 *Salmonella paratyphi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1722 *Salmonella paratyphi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3653 *Salmonella paratyphi* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 3805 *Salmonella paratyphi* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3843 *Salmonella enteritidis* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 3854 *Salmonella enteritidis* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4149 *Salmonella enteritidis* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 2775 *Salmonella dublin* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3329 *Salmonella dublin* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4299 *Salmonella dublin* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 2461 *Saccharomyces cerevisiae* SRY1 THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 4628 *Saccharomyces cerevisiae* ILV1 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 440 *Rickettsia prowazekii* RP449 THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 4537 *Pseudomonas aeruginosa* PA2683 THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 4943 *Pseudomonas aeruginosa* PA0851 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 5035 *Pseudomonas aeruginosa* ilvA1 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 7477 *Pseudomonas aeruginosa* ilvA2 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 686 *Pasteurella multocida* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 671 *Neisseria gonorrhoeae* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1188 *Mycobacterium tuberculosis* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1586 *Mycobacterium leprae*trQ9X7F1 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1 *Mycobacterium bovis* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4030 *Klebsiella pneumoniae* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4031 *Klebsiella pneumoniae* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 7398 *Klebsiella pneumoniae* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 7400 *Klebsiella pneumoniae* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 1633 *Haemophilus influenzae* spP46493 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 2795 *Escherichia coli* b2871 THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 3684 *Escherichia coli* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 5837 *Escherichia coli* tdcB THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 687 *Enterococcus faecalis* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1689 *Corynebacterium diphtheriae* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 741 *Clostridium difficile* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)

4_2_1_16 3502 *Clostridium difficile* EC-tdcB THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 392 *Campylobacter jejuni* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 1673 *Bordetella pertussis* EC-tdcB THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 2180 *Bordetella pertussis* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 4320 *Bordetella pertussis* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 6591 *Bordetella bronchiseptica* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 6597 *Bordetella bronchiseptica* THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 7172 *Bordetella bronchiseptica* EC-ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_16 8269 *Bordetella bronchiseptica* THREONINE DEHYDRATASE CATABOLIC (EC 4_2_1_16)
 4_2_1_16 2175 *Bacillus subtilis* ilvA THREONINE DEHYDRATASE BIOSYNTHETIC (EC 4_2_1_16)
 4_2_1_19 6125 *Yersinia pseudotuberculosis* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 362 *Yersinia pestis* EC-hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 4961 *Vibrio cholerae* El Tor NI6961 ORF01480 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1156 *Streptococcus mutans* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1911 *Staphylococcus aureus* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 507 *Salmonella typhimurium* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1207 *Salmonella typhi* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1579 *Salmonella paratyphi* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19) / HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
 4_2_1_19 294 *Salmonella enteritidis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 8120 *Saccharomyces cerevisiae* HIS3 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 7007 *Pseudomonas aeruginosa* hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1892 *Pasteurella multocida* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 64 *Neisseria gonorrhoeae* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 2630 *Mycobacterium tuberculosis* hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1689 *Mycobacterium leprae* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 2961 *Mycobacterium leprae* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 2257 *Mycobacterium bovis* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 3962 *Klebsiella pneumoniae* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1006 *Haemophilus influenzae* HI0471 HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1970 *Escherichia coli* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 35 *Corynebacterium diphtheriae* IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 1145 *Clostridium difficile* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 2128 *Clostridium acetobutylicum* 6837963_C3_40 IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 895 *Campylobacter jejuni* hisB HISTIDINOL-PHOSPHATASE (EC 3_1_3_15) / IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 763 *Bordetella pertussis* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)

4_2_1_19 7809 *Bordetella bronchiseptica* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_19 3485 *Bacillus subtilis* hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_20 6460 *Yersinia pseudotuberculosis* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 6736 *Yersinia pseudotuberculosis* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 647 *Yersinia pestis* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 3957 *Yersinia pestis* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 4995 *Vibrio cholerae* El Tor N16961 ORF01518 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 4996 *Vibrio cholerae* El Tor N16961 ORF01522 TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 1508 *Streptococcus pneumoniae* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 1509 *Streptococcus pneumoniae* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 805 *Streptococcus mutans* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 1404 *Staphylococcus aureus* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 3405 *Staphylococcus aureus* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 851 *Salmonella typhimurium* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 852 *Salmonella typhimurium* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 4923 *Salmonella typhi* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 4948 *Salmonella typhi* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 4920 *Salmonella paratyphi* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 4921 *Salmonella paratyphi* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 4922 *Salmonella paratyphi* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 4923 *Salmonella paratyphi* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 353 *Salmonella dublin* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 4883 *Saccharomyces cerevisiae* TRP5 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 1312 *Pseudomonas aeruginosa* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2963 *Pseudomonas aeruginosa* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 1534 *Pasteurella multocida* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 1535 *Pasteurella multocida* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 269 *Neurospora crassa* AAA33616_1 TRYPTOPHAN SYNTHASE (EC 4_2_1_20)
 4_2_1_20 20606 *Neurospora crassa* trp-3 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 20628 *Neurospora crassa* trp-3 TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 643 *Neisseria gonorrhoeae* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 1681 *Neisseria gonorrhoeae* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2113 *Mycobacterium tuberculosis* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2114 *Mycobacterium tuberculosis* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2172 *Mycobacterium leprae* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 3457 *Mycobacterium leprae* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 3559 *Mycobacterium bovis* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 3560 *Mycobacterium bovis* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 7319 *Klebsiella pneumoniae* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 7320 *Klebsiella pneumoniae* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 7321 *Klebsiella pneumoniae* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 671 *Helicobacter pylori* HP1277 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 672 *Helicobacter pylori* HP1278 TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 1187 *Helicobacter pylori* J99sp|Q9ZJV0 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 1188 *Helicobacter pylori* J99sp|Q9ZJU9 TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 3006 *Haemophilus influenzae* H11432 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 6596 *Haemophilus influenzae* H11431 TRYPTOPHAN SYNTHASE (EC 4_2_1_20)
 4_2_1_20 4841 *Escherichia coli* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 4842 *Escherichia coli* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 306 *Corynebacterium diphtheriae* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 307 *Corynebacterium diphtheriae* TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 1225 *Corynebacterium diphtheriae* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 211 *Clostridium difficile* TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2033 *Clostridium acetobutylicum* 34267202_F2_6 TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2034 *Clostridium acetobutylicum* 34615937_F3_10 TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)

4_2_1_20 164 *Chlamydia trachomatis* D/UW-3/Cx EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 165 *Chlamydia trachomatis* D/UW-3/Cx EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2330 *Campylobacter jejuni* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2331 *Campylobacter jejuni* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2780 *Bordetella pertussis* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 2781 *Bordetella pertussis* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 6113 *Bordetella bronchiseptica* EC-trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_20 7952 *Bordetella bronchiseptica* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2259 *Bacillus subtilis* trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_20 2260 *Bacillus subtilis* trpB TRYPTOPHAN SYNTHASE BETA CHAIN (EC 4_2_1_20)
 4_2_1_28 42 *Salmonella typhimurium*trjO31041 DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 43 *Salmonella typhimurium*trjO31042 DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 1801 *Salmonella typhi* DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 1802 *Salmonella typhi* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 2912 *Salmonella paratyphi* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 2913 *Salmonella paratyphi* DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 7210 *Salmonella paratyphi* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 406 *Salmonella enteritidis* DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 3581 *Salmonella enteritidis* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 2688 *Salmonella dublin* DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 2690 *Salmonella dublin* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 462 *Klebsiella pneumoniae* DIOL DEHYDRASE (DIOL DEHYDRATASE) GAMMA SUBUNIT (EC 4_2_1_28)
 4_2_1_28 4596 *Klebsiella pneumoniae* DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_30 44 *Salmonella typhimurium* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 3932 *Salmonella typhimurium* pduC GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 1041 *Salmonella typhi* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 1800 *Salmonella typhi* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 2910 *Salmonella paratyphi* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 2911 *Salmonella paratyphi* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 2914 *Salmonella paratyphi* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 2915 *Salmonella paratyphi* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 320 *Salmonella enteritidis* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 405 *Salmonella enteritidis* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 3580 *Salmonella enteritidis* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 2687 *Salmonella dublin* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 2691 *Salmonella dublin* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 2503 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 2504 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 2505 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 4593 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 4594 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 4595 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 4597 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 4598 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 4599 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_30 6395 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_30 6396 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)

4_2_1_30 6397 *Klebsiella pneumoniae* GLYCEROL DEHYDRATASE (EC 4_2_1_30)
 4_2_1_32 2959 *Salmonella typhimurium* ttdA L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2960 *Salmonella typhimurium* ttdB L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 4138 *Salmonella typhimurium* L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_32 1862 *Salmonella typhi* L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 1863 *Salmonella typhi* L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 4874 *Salmonella paratyphi* L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 4875 *Salmonella paratyphi* L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2334 *Salmonella enteritidis* L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2335 *Salmonella enteritidis* L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 456 *Salmonella dublin* L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_32 2660 *Salmonella dublin* L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2139 *Klebsiella pneumoniae* L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_32 4489 *Klebsiella pneumoniae* L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 4490 *Klebsiella pneumoniae* L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 4491 *Klebsiella pneumoniae* L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2984 *Escherichia coli* ttdA L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 2985 *Escherichia coli* ttdB L(+)-TARTRATE DEHYDRATASE BETA SUBUNIT (EC 4_2_1_32)
 4_2_1_32 1230 *Clostridium difficile* EC-ttdA L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_32 1369 *Clostridium acetobutylicum* 3909760_C1_33 L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_32 7540 *Bordetella bronchiseptica* EC-ttdA L(+)-TARTRATE DEHYDRATASE (EC 4_2_1_32)
 4_2_1_33 5771 *Yersinia pseudotuberculosis* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 5772 *Yersinia pseudotuberculosis* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4199 *Yersinia pestis* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4200 *Yersinia pestis* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 6249 *Vibrio cholerae* El Tor N16961 ORF03149 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 6250 *Vibrio cholerae* El Tor N16961 ORF03150 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 355 *Streptococcus pneumoniae* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1052 *Streptococcus mutans* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1053 *Streptococcus mutans* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1646 *Staphylococcus aureus* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2971 *Staphylococcus aureus* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 566 *Salmonella typhimurium* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3330 *Salmonella typhimurium* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 5387 *Salmonella typhimurium* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 997 *Salmonella typhi* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4744 *Salmonella typhi* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1776 *Salmonella paratyphi* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3569 *Salmonella paratyphi* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1689 *Salmonella enteritidis* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4396 *Salmonella enteritidis* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 3706 *Salmonella dublin* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3707 *Salmonella dublin* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)

4_2_1_33 8475 *Saccharomyces cerevisiae* LEU1 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 588 *Pseudomonas aeruginosa* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1644 *Pseudomonas aeruginosa* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1210 *Pasteurella multocida* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1211 *Pasteurella multocida* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 164 *Neisseria gonorrhoeae* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 166 *Neisseria gonorrhoeae* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3319 *Mycobacterium tuberculosis* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3320 *Mycobacterium tuberculosis* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3102 *Mycobacterium leprae* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3103 *Mycobacterium lepraespjO33124* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2748 *Mycobacterium bovis* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2749 *Mycobacterium bovis* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3815 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3816 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3817 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 3818 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4245 *Klebsiella pneumoniae* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2099 *Haemophilus influenzae* HI0988 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 9363 *Haemophilus influenzae* HI0989 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4318 *Escherichia coli* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4319 *Escherichia coli* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1924 *Corynebacterium diphtheriae* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1925 *Corynebacterium diphtheriae* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 548 *Clostridium difficile* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 549 *Clostridium difficile* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2235 *Clostridium acetobutylicum* 33225017_C2_26 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 2236 *Clostridium acetobutylicum* 4814035_C3_29 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1066 *Campylobacter jejuni* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 1068 *Campylobacter jejuni* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 518 *Bordetella pertussis* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)

4_2_1_33 2722 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2723 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2724 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 4026 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4027 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 4028 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 4687 *Bordetella pertussis* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 5660 *Bordetella bronchiseptica* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 7336 *Bordetella bronchiseptica* 3-ISOPROPYLMALATE DEHYDRATASE (EC 4_2_1_33)
 4_2_1_33 7337 *Bordetella bronchiseptica* EC-leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 8113 *Bordetella bronchiseptica* 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 8114 *Bordetella bronchiseptica* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 8818 *Bordetella bronchiseptica* 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2819 *Bacillus subtilis* leuD 3-ISOPROPYLMALATE DEHYDRATASE SMALL SUBUNIT (EC 4_2_1_33)
 4_2_1_33 2820 *Bacillus subtilis* leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_40 2793 *Salmonella typhimurium* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 3711 *Salmonella typhimurium* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 1737 *Salmonella typhi* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 5306 *Salmonella typhi* PROBABLE GLUCARATE DEHYDRATASE 2 (EC 4_2_1_40)
 4_2_1_40 2008 *Salmonella paratyphi* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 3412 *Salmonella enteritidis* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 3737 *Salmonella dublin* GLUCARATE DEHYDRATASE (EC 4_2_1_40)
 4_2_1_40 1163 *Klebsiella pneumoniae* PROBABLE GLUCARATE DEHYDRATASE (EC 4_2_1_40)
 4_2_1_40 1164 *Klebsiella pneumoniae* PROBABLE GLUCARATE DEHYDRATASE (EC 4_2_1_40)
 4_2_1_40 2075 *Klebsiella pneumoniae* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 2076 *Klebsiella pneumoniae* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 2078 *Klebsiella pneumoniae* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 2079 *Klebsiella pneumoniae* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 5659 *Escherichia coli* b2787 GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_40 5660 *Escherichia coli* b2788 PROBABLE GLUCARATE DEHYDRATASE (EC 4_2_1_40)
 4_2_1_40 250 *Bacillus subtilis* ycbF GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_41 247 *Bacillus subtilis* ycbC 5-DEHYDRO-4-DEOXYGLUCARATE DEHYDRATASE (EC 4_2_1_41)
 4_2_1_42 4594 *Salmonella typhimurium* yhaG D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 1758 *Salmonella typhi* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 5794 *Salmonella paratyphi* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 2192 *Salmonella enteritidis* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 799 *Salmonella dublin* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 3116 *Klebsiella pneumoniae* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 3117 *Klebsiella pneumoniae* D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 3052 *Escherichia coli* yhaG D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_42 252 *Bacillus subtilis* ycbH D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_45 9 *Yersinia pseudotuberculosis* BS-yfnG CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 2641 *Yersinia pestis* BS-yfnG CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 6487 *Salmonella typhimurium* rfbG CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 627 *Salmonella typhi* CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 4897 *Salmonella paratyphi* CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 1374 *Salmonella enteritidis* CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_45 728 *Bacillus subtilis* yfnG CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_49 5599 *Yersinia pseudotuberculosis* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 2965 *Yersinia pestis* BS-hutU UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 5029 *Vibrio cholerae* El Tor N16961 ORF01563 UROCANATE HYDRATASE (EC 4_2_1_49)

4_2_1_49 1121 *Streptococcus pyogenes* hutU UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 3183 *Staphylococcus aureus* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 3272 *Staphylococcus aureus* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 1605 *Salmonella typhimurium* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 7062 *Salmonella typhimurium* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 3593 *Salmonella typhi* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 1883 *Salmonella paratyphi* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 1884 *Salmonella paratyphi* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 1885 *Salmonella paratyphi* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 2381 *Salmonella enteritidis* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 3647 *Salmonella dublin* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 7888 *Pseudomonas aeruginosa* hutU UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 637 *Porphyromonas gingivalis* BS-hutU UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 4381 *Klebsiella pneumoniae* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_49 3929 *Bacillus subtilis* hutU UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_51 6915 *Yersinia pseudotuberculosis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2830 *Yersinia pestis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 3649 *Yersinia pestis* PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 4563 *Vibrio cholerae* El Tor N16961 ORF00951 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 392 *Streptococcus pneumoniae* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 561 *Streptococcus mutans* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2031 *Staphylococcus aureus* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 3905 *Salmonella typhimurium* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 1837 *Salmonella typhi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 1601 *Salmonella paratyphi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 79 *Salmonella enteritidis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2614 *Saccharomyces cerevisiae* PHA2 PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 3027 *Pseudomonas aeruginosa* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 572 *Pasteurella multocida* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 1366 *Neisseria gonorrhoeae* sp. Q9ZHY3 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 307 *Mycobacterium tuberculosis* pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 1610 *Mycobacterium leprae* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 846 *Mycobacterium bovis* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 7342 *Klebsiella pneumoniae* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 5998 *Haemophilus influenzae* H1145 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 281 *Haemophilus ducreyi* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2535 *Escherichia coli* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2257 *Enterococcus faecium* (DOE) PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2194 *Enterococcus faecalis* EC-pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2150 *Corynebacterium diphtheriae* PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2417 *Clostridium difficile* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 732 *Clostridium acetobutylicum* 16601575_C1_44 PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2276 *Campylobacter jejuni* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 195 *Bordetella pertussis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)

4_2_1_51 2692 *Bordetella pertussis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2694 *Bordetella pertussis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 7356 *Bordetella bronchiseptica* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_51 2784 *Bacillus subtilis* pheA PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_52 5705 *Yersinia pseudotuberculosis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 281 *Yersinia pestis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 5944 *Vibrio cholerae* El Tor NI6961 ORF02728 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1356 *Streptococcus pneumoniae* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1765 *Streptococcus mutans* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1398 *Staphylococcus aureus* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1737 *Salmonella typhimurium* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2684 *Salmonella typhimurium* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1296 *Salmonella typhi* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4037 *Salmonella paratyphi* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4038 *Salmonella paratyphi* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2837 *Salmonella enteritidis* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2559 *Salmonella dublin* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 420 *Rickettsia prowazekii* RP429 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4294 *Pseudomonas aeruginosa* PA0223 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 5773 *Pseudomonas aeruginosa* PA1254 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 7176 *Pseudomonas aeruginosa* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 7818 *Pseudomonas aeruginosa* PA4188 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1241 *Porphyromonas gingivalis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 645 *Pasteurella multocida* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 546 *Neisseria gonorrhoeae* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4893 *Mycobacterium tuberculosis* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 158 *Mycobacterium leprae* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2884 *Mycobacterium bovis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 3365 *Klebsiella pneumoniae* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 8541 *Klebsiella pneumoniae* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 419 *Helicobacter pylori* HP1013 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 412 *Helicobacter pylori* J99 dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4233 *Haemophilus influenzae* HI0255 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1034 *Haemophilus ducreyi* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 259 *Escherichia coli* yagE DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 5503 *Escherichia coli* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 6423 *Escherichia coli* yjH DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1725 *Enterococcus faecium* (DOE) DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2022 *Enterococcus faecalis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1110 *Corynebacterium diphtheriae* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1849 *Corynebacterium diphtheriae* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1032 *Clostridium difficile* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1034 *Clostridium difficile* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1072 *Clostridium difficile* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 2271 *Clostridium difficile* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 804 *Clostridium acetobutylicum* 25820327_F3_23 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 3322 *Clostridium acetobutylicum* 33450_CI_5 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 343 *Chlamydia trachomatis* D/UW-3/Cx EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 802 *Chlamydia pneumoniae* AR39 CP0802 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 972 *Chlamydia pneumoniae* CWL029 dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 425 *Campylobacter jejuni* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 580 *Campylobacter jejuni* Cj0481 DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 315 *Bordetella pertussis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 4273 *Bordetella pertussis* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 6595 *Bordetella bronchiseptica* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)

4_2_1_52 7186 *Bordetella bronchiseptica* DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 7482 *Bordetella bronchiseptica* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_52 1677 *Bacillus subtilis* dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_55 3151 *Pseudomonas aeruginosa* PA2767 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 5498 *Pseudomonas aeruginosa* PA2890 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 6815 *Pseudomonas aeruginosa* PA0745 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 2691 *Mycobacterium tuberculosis* echA18 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 2807 *Mycobacterium tuberculosis* echA20 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 510 *Mycobacterium bovis* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 6320 *Klebsiella pneumoniae* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 6321 *Klebsiella pneumoniae* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 1353 *Escherichia coli* b1393 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 822 *Clostridium difficile* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 532 *Clostridium acetobutylicum* 32812_C1_69 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 146 *Bordetella pertussis* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 176 *Bordetella pertussis* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 6532 *Bordetella bronchiseptica* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 6859 *Bordetella bronchiseptica* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 7942 *Bordetella bronchiseptica* 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 1821 *Bacillus subtilis* yngF 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_55 2848 *Bacillus subtilis* ysiB 3-HYDROXYBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_6 5846 *Salmonella typhimurium* GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_6 110 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21) / GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_6 4107 *Salmonella enteritidis* GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_6 3832 *Salmonella dublin* GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_6 6545 *Escherichia coli* yidU 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21) / GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_60 151 *Yersinia pestis* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 3762 *Yersinia pestis* EC-fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 5295 *Vibrio cholerae* El Tor N16961 ORF01901 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 1624 *Salmonella typhimurium* fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 4141 *Salmonella typhi* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 5226 *Salmonella paratyphi* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 2035 *Salmonella enteritidis* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 3001 *Pseudomonas aeruginosa* fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 1496 *Pasteurella multocida* fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 5476 *Klebsiella pneumoniae* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 2804 *Haemophilus influenzae* HI1325 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 1367 *Haemophilus ducreyi* EC-fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_60 4700 *Escherichia coli* fabA 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_61 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3-HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN]

ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER- PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 4_2_1_61 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 1599 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 2377 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 2378 *Mycobacterium leprae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 2541 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 2542 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 3303 *Mycobacterium bovis* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_61 2484 *Corynebacterium diphtheriae* FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 4_2_1_7 5291 *Yersinia pseudotuberculosis* EC-uxaA ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 3855 *Yersinia pestis* EC-uxaA ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4662 *Yersinia pestis* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 6395 *Salmonella typhimurium* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 6396 *Salmonella typhimurium* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 6397 *Salmonella typhimurium* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 915 *Salmonella typhi* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4831 *Salmonella typhi* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 3604 *Salmonella paratyphi* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 3605 *Salmonella paratyphi* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 5793 *Salmonella paratyphi* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 2804 *Salmonella enteritidis* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 5114 *Salmonella enteritidis* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4215 *Salmonella dublin* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4069 *Klebsiella pneumoniae* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4070 *Klebsiella pneumoniae* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4071 *Klebsiella pneumoniae* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4072 *Klebsiella pneumoniae* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 4073 *Klebsiella pneumoniae* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 5823 *Escherichia coli* uxaA ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 1910 *Enterococcus faecium* (DOE) EC-uxaA ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 1537 *Clostridium difficile* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 1538 *Clostridium difficile* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 2269 *Clostridium difficile* ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 1099 *Clostridium acetobutylicum* 34620885_C1_52 ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 576 *Campylobacter jejuni* uxaA' ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 579 *Campylobacter jejuni* uxaA' ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_7 1240 *Bacillus subtilis* yjmJ ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_8 4452 *Yersinia pseudotuberculosis* EC-uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 791 *Yersinia pestis* EC-uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 448 *Streptococcus equi* EC-uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 6664 *Salmonella typhimurium* uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 5342 *Salmonella typhi* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 5507 *Salmonella paratyphi* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 5508 *Salmonella paratyphi* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 1937 *Salmonella enteritidis* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 762 *Salmonella dublin* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 926 *Klebsiella pneumoniae* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 927 *Klebsiella pneumoniae* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 3839 *Klebsiella pneumoniae* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 3840 *Klebsiella pneumoniae* MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 122 *Haemophilus influenzae* HI0055 MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 4205 *Escherichia coli* uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 3135 *Enterococcus faecium* (DOE) MANNONATE DEHYDRATASE (EC 4_2_1_8)

4_2_1_8 3519 *Enterococcus faecium* (DOE) MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 830 *Enterococcus faecalis* EC-uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 2081 *Clostridium acetobutylicum* 19535877_F1_4 MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_8 1235 *Bacillus subtilis* yjmE MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_84 560 *Mycobacterium tuberculosis* Rv0106 NITRILE HYDRATASE SUBUNIT BETA (EC 4_2_1_84)
 4_2_1_84 2975 *Mycobacterium bovis* BS-yciC NITRILE HYDRATASE SUBUNIT BETA (EC 4_2_1_84)
 4_2_1_89 3943 *Salmonella typhimurium* caiB L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_89 3203 *Salmonella typhi* L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_89 2563 *Salmonella paratyphi* L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_89 2553 *Salmonella enteritidis* L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_89 4299 *Escherichia coli* caiB L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_9 8029 *Yersinia pseudotuberculosis* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3873 *Yersinia pestis* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3912 *Vibrio cholerae* El Tor N16961 ORF00055 DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 486 *Streptococcus pneumoniae* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1176 *Streptococcus mutans* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1641 *Staphylococcus aureus* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2086 *Salmonella typhimurium* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2682 *Salmonella typhimurium* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2256 *Salmonella typhi* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3931 *Salmonella paratyphi* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3311 *Salmonella enteritidis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 4150 *Salmonella enteritidis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2561 *Salmonella dublin* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3158 *Salmonella dublin* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1997 *Saccharomyces cerevisiae* ILV3 DIHYDROXY-ACID DEHYDRATASE, MITOCHONDRIAL PRECURSOR (EC 4_2_1_9)
 4_2_1_9 5294 *Pseudomonas aeruginosa* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 687 *Pasteurella multocida* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 632 *Neisseria gonorrhoeae* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 5176 *Mycobacterium tuberculosis* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2902 *Mycobacterium leprae* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3351 *Mycobacterium leprae* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 576 *Mycobacterium bovis* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 577 *Mycobacterium bovis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 4959 *Klebsiella pneumoniae* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 4961 *Klebsiella pneumoniae* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 8890 *Haemophilus influenzae* HI0738 DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 260 *Escherichia coli* yagF DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3683 *Escherichia coli* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 6509 *Escherichia coli* yjhG DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 376 *Corynebacterium diphtheriae* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1089 *Clostridium difficile* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 808 *Clostridium acetobutylicum* 34178200_F3_25 DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 809 *Clostridium acetobutylicum* 42216_F2_14 DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2233 *Clostridium acetobutylicum* 5133562_C3_30 DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1116 *Campylobacter jejuni* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1729 *Bordetella pertussis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 1730 *Bordetella pertussis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2118 *Bordetella pertussis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2836 *Bordetella pertussis* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3077 *Bordetella pertussis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 3988 *Bordetella pertussis* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 5399 *Bordetella bronchiseptica* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 5435 *Bordetella bronchiseptica* DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_9 2185 *Bacillus subtilis* ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_90 5362 *Escherichia coli* b2247 L-rhamnonate dehydratase (EC 4_2_1_90)
 4_2_2_1 959 *Streptococcus pyogenes* hylA HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_1 722 *Streptococcus pneumoniae* HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_1 1097 *Streptococcus equi* HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_1 136 *Staphylococcus aureus* sp|Q59801 HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_1 67 *Enterococcus faecalis* HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)

4_2_2_1 1909 *Enterococcus faecalis* HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_10 1863 *Bacillus subtilis* pelB PECTIN LYASE (EC 4_2_2_10)
 4_2_2_2 72 *Yersinia pseudotuberculosis* PERIPLASMIC PECTATE LYASE PRECURSOR (EC 4_2_2_2)
 4_2_2_2 4214 *Yersinia pestis* PERIPLASMIC PECTATE LYASE PRECURSOR (EC 4_2_2_2)
 4_2_2_2 1 *Clostridium acetobutylicum* 24642132_F2_25 pectate lyase (EC 4_2_2_2) precursor - *Erwinia chrysanthemi*
 4_2_2_2 2612 *Clostridium acetobutylicum* 34275312_C1_10 PECTATE LYASE C (EC 4_2_2_2)
 4_2_2_2 756 *Bacillus subtilis* pel PECTATE LYASE (EC 4_2_2_2)
 4_2_2_2 3490 *Bacillus subtilis* yvpA PECTATE LYASE (EC 4_2_2_2)
 4_2_2_3 1653 *Pseudomonas aeruginosa* algL ALGINATE LYASE PRECURSOR (EC 4_2_2_3)
 4_2_2_3 8406 *Pseudomonas aeruginosa* PA1784 ALGINATE LYASE PRECURSOR (EC 4_2_2_3)
 4_2_2_3 8559 *Pseudomonas aeruginosa* PA1167 ALGINATE LYASE PRECURSOR (EC 4_2_2_3)
 4_2_2_6 3752 *Yersinia pestis* OLIGOGALACTURONATE LYASE (EC 4_2_2_6)
 4_2_2_6 6161 *Klebsiella pneumoniae* OLIGOGALACTURONATE LYASE (EC 4_2_2_6)
 4_2_2_9 7092 *Yersinia pseudotuberculosis* EXOPOLY GALACTURONATE LYASE (EC 4_2_2_9)
 4_2_2_9 708 *Yersinia pestis* EXOPOLY GALACTURONATE LYASE (EC 4_2_2_9)
 4_2_2_9 2666 *Enterococcus faecium* (DOE) EXOPOLY GALACTURONATE LYASE PRECURSOR (EC 4_2_2_9)
 4_2_99_10 1236 *Streptococcus pneumoniae* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 974 *Streptococcus mutans* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 4079 *Saccharomyces cerevisiae* MET17 O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 1621 *Pseudomonas aeruginosa* metY O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 659 *Pasteurella multocida* metC_1 O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 5138 *Mycobacterium tuberculosis* metC O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 1554 *Mycobacterium bovis* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 560 *Corynebacterium diphtheriae* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 2428 *Clostridium difficile* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 437 *Clostridium acetobutylicum* 36520263_C1_73 O-ACETYLHOMOSERINE (THIOL)-LYASE (EC 4_2_99_10)
 4_2_99_10 455 *Clostridium acetobutylicum* 1368802_C2_86 O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 1079 *Campylobacter jejuni* metY O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 3913 *Bordetella pertussis* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 83 *Bordetella bronchiseptica* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_10 9119 *Bordetella bronchiseptica* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_11 6467 *Yersinia pseudotuberculosis* EC-yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 7217 *Vibrio cholerae* El Tor N16961ORFA00406 METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 2906 *Salmonella typhimurium* mgsA METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 180 *Salmonella typhi* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 5868 *Salmonella paratyphi* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 1100 *Salmonella enteritidis* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 1409 *Pasteurella multocida* mgsA METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 5459 *Klebsiella pneumoniae* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 5460 *Klebsiella pneumoniae* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 9862 *Haemophilus influenzae* H11234 METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 4706 *Escherichia coli* yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 782 *Enterococcus faecium* (DOE) METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 2687 *Enterococcus faecalis* EC-yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 1983 *Clostridium difficile* EC-yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)

4_2_99_11 2667 *Clostridium acetobutylicum* 20313802_F1_1 METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 385 *Borrelia burgdorferi* BB0364 METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 3442 *Bordetella pertussis* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 3935 *Bordetella pertussis* EC-yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 5900 *Bordetella bronchiseptica* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 6413 *Bordetella bronchiseptica* METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_11 2244 *Bacillus subtilis* ypfF METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_2 7399 *Yersinia pseudotuberculosis* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 2354 *Yersinia pestis* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 6129 *Vibrio cholerae* El Tor N16961 ORF02991 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 373 *Streptococcus pneumoniae* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1319 *Streptococcus mutans* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1634 *Streptococcus equi* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1315 *Staphylococcus aureus* BS-thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3758 *Salmonella typhimurium* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3637 *Salmonella typhi* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 227 *Salmonella paratyphi* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 228 *Salmonella paratyphi* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1369 *Salmonella paratyphi* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 2630 *Salmonella enteritidis* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3066 *Salmonella dublin* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3985 *Saccharomyces cerevisiae* THR4 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 4172 *Pseudomonas aeruginosa* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 470 *Pasteurella multocida* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 593 *Neisseria gonorrhoeae* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 910 *Mycobacterium tuberculosis* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1201 *Mycobacterium leprae* BS-thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1272 *Mycobacterium bovis* BS-thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3563 *Klebsiella pneumoniae* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3564 *Klebsiella pneumoniae* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1055 *Helicobacter pylori* HP0098 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 94 *Helicobacter pylori* J99spJQ9ZMX5 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 18063 *Haemophilus influenzae* HI0087 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 4 *Escherichia coli* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 2512 *Enterococcus faecalis* BS-thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 689 *Corynebacterium diphtheriae* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 2149 *Clostridium difficile* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 1560 *Clostridium acetobutylicum* 24798260_C3_34 THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 415 *Campylobacter jejuni* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3119 *Bordetella pertussis* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 9012 *Bordetella bronchiseptica* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_2 3220 *Bacillus subtilis* thrC THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_8 5928 *Yersinia pseudotuberculosis* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 5940 *Yersinia pseudotuberculosis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 6821 *Yersinia pseudotuberculosis* EC-cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 27 *Yersinia pestis* EC-cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 767 *Yersinia pestis* EC-cysK CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 2966 *Yersinia pestis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4001 *Yersinia pestis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4400 *Vibrio cholerae* El Tor N16961 ORF00749 CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 4801 *Vibrio cholerae* El Tor N16961 ORF01279 CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 4887 *Vibrio cholerae* El Tor N16961 ORF01392 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1469 *Streptococcus pyogenes* cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 604 *Streptococcus pneumoniae* EC-cysM CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1236 *Streptococcus pneumoniae* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYLSELINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 901 *Streptococcus mutans* EC-cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 974 *Streptococcus mutans* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYLSELINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 1387 *Streptococcus equi* EC-cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 821 *Staphylococcus aureus* BS-yrhA CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2342 *Staphylococcus aureus* EC-cysK CYSTEINE SYNTHASE (EC 4_2_99_8)

4_2_99_8 3240 *Staphylococcus aureus* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 346 *Salmonella typhimurium* cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 1547 *Salmonella typhimurium* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2765 *Salmonella typhimurium* cysK CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 2446 *Salmonella typhi* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3789 *Salmonella typhi* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4212 *Salmonella typhi* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1432 *Salmonella paratyphi* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 1433 *Salmonella paratyphi* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1978 *Salmonella paratyphi* CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 1979 *Salmonella paratyphi* CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 1980 *Salmonella paratyphi* CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 4320 *Salmonella paratyphi* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3094 *Salmonella enteritidis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3447 *Salmonella enteritidis* CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 2830 *Salmonella dublin* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4245 *Salmonella dublin* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 4079 *Saccharomyces cerevisiae* MET17 O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 8514 *Saccharomyces cerevisiae* YGR012W CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1621 *Pseudomonas aeruginosa* metY O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 3748 *Pseudomonas aeruginosa* PA1061 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4758 *Pseudomonas aeruginosa* cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 5996 *Pseudomonas aeruginosa* cysK CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 6214 *Pseudomonas aeruginosa* PA2104 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 659 *Pasteurella multocida* metC₁ O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 733 *Pasteurella multocida* cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1433 *Neisseria gonorrhoeae* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1995 *Neisseria gonorrhoeae* CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 1339 *Mycobacterium tuberculosis* cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3027 *Mycobacterium tuberculosis* cysM3 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 4346 *Mycobacterium tuberculosis* Rv3684 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 5138 *Mycobacterium tuberculosis* metC O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 5673 *Mycobacterium tuberculosis* cysM PROBABLE CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1148 *Mycobacterium leprae*trjQ49709 PROBABLE CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3817 *Mycobacterium leprae*spjO32978 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 940 *Mycobacterium bovis* EC-cysM CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1554 *Mycobacterium bovis* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 1572 *Mycobacterium bovis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1999 *Mycobacterium bovis* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3365 *Mycobacterium bovis* PROBABLE CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3562 *Mycobacterium bovis* EC-cysM CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3588 *Klebsiella pneumoniae* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 3589 *Klebsiella pneumoniae* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 3590 *Klebsiella pneumoniae* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 5041 *Klebsiella pneumoniae* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1064 *Helicobacter pylori* HP0107 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 103 *Helicobacter pylori* J99trjQ9ZMW6 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 5925 *Haemophilus influenzae* HI1103 CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 301 *Haemophilus ducreyi* EC-cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2355 *Escherichia coli* cysK CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 6608 *Escherichia coli* cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 470 *Enterococcus faecium* (DOE) CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 655 *Enterococcus faecium* (DOE) CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 1190 *Enterococcus faecalis* BS-yrhA CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2619 *Enterococcus faecalis* EC-cysM CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 318 *Corynebacterium diphtheriae* CYSTEINE SYNTHASE (EC 4_2_99_8)

4_2_99_8 560 *Corynebacterium diphtheriae* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 1241 *Clostridium difficile* EC-cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2305 *Clostridium difficile* CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2428 *Clostridium difficile* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 455 *Clostridium acetobutylicum* I368802_C2_86 O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 2238 *Clostridium acetobutylicum* 24662812_C2_36 CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 3622 *Clostridium acetobutylicum* 36359625_F2_3 CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 1079 *Campylobacter jejuni* metY O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 1316 *Campylobacter jejuni* cysM CYSTEINE SYNTHASE B (EC 4_2_99_8)
 4_2_99_8 494 *Bordetella pertussis* EC-cysM CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 3913 *Bordetella pertussis* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 83 *Bordetella bronchiseptica* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 9119 *Bordetella bronchiseptica* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_8 9195 *Bordetella bronchiseptica* EC-cysK CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_8 73 *Bacillus subtilis* cysK CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2719 *Bacillus subtilis* yrhA CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_8 2991 *Bacillus subtilis* ytkP CYSTEINE SYNTHASE (EC 4_2_99_8)
 4_2_99_9 6531 *Yersinia pseudotuberculosis* EC-metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 372 *Yersinia pestis* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 5244 *Yersinia pestis* EC-metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 6431 *Vibrio cholerae* El Tor N16961 ORF03392 CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1273 *Streptococcus pneumoniae* BS-yjcl CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1222 *Staphylococcus aureus* BS-yjcl CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 3865 *Salmonella typhimurium* metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 5451 *Salmonella typhi* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 4365 *Salmonella paratyphi* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 4366 *Salmonella paratyphi* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 4367 *Salmonella paratyphi* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 2940 *Salmonella enteritidis* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 2413 *Saccharomyces cerevisiae* STR2 CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 6199 *Saccharomyces cerevisiae* YLL058W CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 6945 *Saccharomyces cerevisiae* YML082W CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 251 *Pasteurella multocida* metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 2895 *Mycobacterium tuberculosis* metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1383 *Mycobacterium leprae* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 2650 *Mycobacterium leprae* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1059 *Mycobacterium bovis* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1747 *Mycobacterium bovis* EC-metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 4262 *Klebsiella pneumoniae* CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 14471 *Haemophilus influenzae* HI0086 CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 3837 *Escherichia coli* metB CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 2239 *Clostridium acetobutylicum* 4096912_C3_41 CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_2_99_9 1188 *Bacillus subtilis* yjcl CYSTATHIONINE GAMMA-SYNTHASE (EC 4_2_99_9)
 4_3_1_1 6333 *Yersinia pseudotuberculosis* EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 3990 *Yersinia pestis* EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 6446 *Vibrio cholerae* El Tor N16961 ORF03414 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 3052 *Salmonella typhimurium* aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1971 *Salmonella typhi* ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 664 *Salmonella paratyphi* ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1616 *Salmonella paratyphi* ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1617 *Salmonella paratyphi* ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 880 *Salmonella enteritidis* ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 8072 *Pseudomonas aeruginosa* aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)

4_3_1_1 1571 Porphyromonas gingivalis EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1821 Pasteurella multocida aspA ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 2040 Neisseria gonorrhoeae EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1648 Klebsiella pneumoniae ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 2098 Klebsiella pneumoniae ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 83 Helicobacter pylori HP0649 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 594 Helicobacter pylori J99tr|Q9ZLI5 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 17167 Haemophilus influenzae HI0534 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 188 Haemophilus ducreyi EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 6354 Escherichia coli aspA ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1087 Corynebacterium diphtheriae ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1484 Clostridium acetobutylicum 36135967_F3_36 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1485 Clostridium acetobutylicum 5117212_FI_9 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 1709 Clostridium acetobutylicum 48803_C2_31 ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 2735 Campylobacter jejuni aspA ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_1 2353 Bacillus subtilis ansB ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_12 7087 Yersinia pseudotuberculosis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 1959 Yersinia pestis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 4596 Yersinia pestis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 1800 Staphylococcus aureus ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 3355 Pseudomonas aeruginosa PA4908 ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 5986 Pseudomonas aeruginosa PA3862 ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 3416 Enterococcus faecium (DOE) ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 1365 Enterococcus faecalis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 2263 Enterococcus faecalis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 2165 Clostridium difficile ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 4112 Bordetella pertussis ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_12 8920 Bordetella bronchiseptica ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_15 7921 Bordetella bronchiseptica PUTATIVE DIAMINOPROPIONATE AMMONIA-LYASE (EC 4_3_1_15)
 4_3_1_2 3034 Bordetella pertussis METHYLASPARTATE AMMONIA-LYASE (EC 4_3_1_2)
 4_3_1_2 6110 Bordetella bronchiseptica METHYLASPARTATE AMMONIA-LYASE (EC 4_3_1_2)
 4_3_1_5 6294 Salmonella paratyphi PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_5 1943 Salmonella enteritidis PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_5 1752 Salmonella dublin PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_5 311 Escherichia coli b0327 PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_5 5639 Escherichia coli b2760 PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_7 1085 Salmonella typhimurium eutC ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 2884 Salmonella typhimurium eutB ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 816 Salmonella typhi ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 1125 Salmonella typhi ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6 Salmonella paratyphi ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 7 Salmonella paratyphi ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 1604 Salmonella paratyphi ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 1605 Salmonella paratyphi ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 3350 Salmonella enteritidis ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 5290 Salmonella enteritidis ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 646 Salmonella dublin ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 1128 Pseudomonas aeruginosa PA4025 ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 1129 Pseudomonas aeruginosa eutB ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6657 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6658 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6659 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6660 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 6661 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 6662 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 8117 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 8118 Klebsiella pneumoniae ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)

4_3_1_7 5480 *Escherichia coli* eutC ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 5481 *Escherichia coli* eutB ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 2448 *Enterococcus faecalis* EC-eutC ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 2449 *Enterococcus faecalis* EC-eutB ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 2079 *Clostridium difficile* EC-eutC ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 2080 *Clostridium difficile* EC-eutB ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_1_7 537 *Clostridium acetobutylicum* 4096905_C1_64 ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC 4_3_1_7)
 4_3_1_7 538 *Clostridium acetobutylicum* 4064703_C2_78 ETHANOLAMINE AMMONIA-LYASE HEAVY CHAIN (EC 4_3_1_7)
 4_3_99_1 2083 *Pseudomonas aeruginosa* cynS CYANATE LYASE (EC 4_3_99_1)
 4_3_99_1 324 *Escherichia coli* cynS CYANATE LYASE (EC 4_3_99_1)
 4_4_1_11 1209 *Porphyromonas gingivalis* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_11 5071 *Klebsiella pneumoniae* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_11 78 *Enterococcus faecalis* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_11 1705 *Enterococcus faecalis* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_11 1431 *Clostridium difficile* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_8 4224 *Yersinia pseudotuberculosis* EC-metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 4759 *Yersinia pseudotuberculosis* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2380 *Yersinia pestis* EC-metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 4984 *Yersinia pestis* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 5470 *Vibrio cholerae* El Tor N16961 ORF02139 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 899 *Streptococcus pyogenes* metB CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 3355 *Staphylococcus aureus* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 6635 *Salmonella typhimurium* metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 3703 *Salmonella typhi* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 5371 *Salmonella paratyphi* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 5372 *Salmonella paratyphi* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 124 *Salmonella enteritidis* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 3965 *Salmonella dublin* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2261 *Saccharomyces cerevisiae* YFR055W CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 3906 *Saccharomyces cerevisiae* STR3 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 1655 *Pasteurella multocida* metC_2 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 734 *Mycobacterium bovis* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 883 *Klebsiella pneumoniae* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 6295 *Klebsiella pneumoniae* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 6296 *Klebsiella pneumoniae* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 14381 *Haemophilus influenzae* HI0122 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2930 *Escherichia coli* metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 3702 *Enterococcus faecium* (DOE) CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 300 *Clostridium acetobutylicum* 34109667_C2_86 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 302 *Clostridium acetobutylicum* 5276713_C1_71 CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 638 *Campylobacter jejuni* metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2237 *Bordetella pertussis* EC-metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2913 *Bordetella pertussis* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 7683 *Bordetella bronchiseptica* EC-metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 9044 *Bordetella bronchiseptica* CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 1189 *Bacillus subtilis* yjcJ CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_4_1_8 2718 *Bacillus subtilis* yrhB CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_6_1_3 4442 *Yersinia pseudotuberculosis* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 553 *Yersinia pestis* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 6377 *Vibrio cholerae* El Tor N16961 ORF03324 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1077 *Streptococcus pyogenes* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 386 *Streptococcus pneumoniae* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1620 *Streptococcus mutans* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 444 *Streptococcus equi* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1172 *Staphylococcus aureus* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 301 *Salmonella typhimurium* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)

4_6_1_3 39 *Salmonella typhi* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3147 *Salmonella paratyphi* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3149 *Salmonella paratyphi* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3150 *Salmonella paratyphi* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 609 *Salmonella enteritidis* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3746 *Pseudomonas aeruginosa* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 199 *Porphyromonas gingivalis* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 867 *Pasteurella multocida* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1380 *Neisseria gonorrhoeae* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3205 *Mycobacterium tuberculosis* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 2739 *Mycobacterium leprae* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 3332 *Mycobacterium bovis* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 6708 *Klebsiella pneumoniae* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1230 *Helicobacter pylori* HP0283 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 273 *Helicobacter pylori* J99sp|Q9ZMF2 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 463 *Haemophilus influenzae* HI0208 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 780 *Haemophilus ducreyi* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 5984 *Escherichia coli* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 2437 *Enterococcus faecium* (DOE) 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1360 *Enterococcus faecalis* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 745 *Corynebacterium diphtheriae* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 2420 *Clostridium difficile* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1752 *Clostridium acetobutylicum* 24899187_F3_11 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 351 *Chlamydia trachomatis* D/UW-3/Cx EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 816 *Chlamydia pneumoniae* AR39-CP0816 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 958 *Chlamydia pneumoniae* CWL029 EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 1783 *Campylobacter jejuni* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 4162 *Bordetella pertussis* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 8120 *Bordetella bronchiseptica* EC-aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_3 2266 *Bacillus subtilis* aroB 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_4 7968 *Yersinia pseudotuberculosis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 3993 *Yersinia pestis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 5909 *Vibrio cholerae* El Tor N16961 ORF02673 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 571 *Streptococcus pyogenes* aroF CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 387 *Streptococcus pneumoniae* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1619 *Streptococcus mutans* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1445 *Streptococcus equi* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 145 *Staphylococcus aureus* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1221 *Salmonella typhimurium* aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2321 *Salmonella typhi* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1651 *Salmonella paratyphi* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 928 *Salmonella enteritidis* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 722 *Salmonella dublin* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 5895 *Saccharomyces cerevisiae* ARO2 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 7489 *Pseudomonas aeruginosa* aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1318 *Porphyromonas gingivalis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 626 *Pasteurella multocida* aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 44 *Neurospora crassa* AAC49056_1 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 448 *Neisseria gonorrhoeae* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 5876 *Mycobacterium tuberculosis* aroF CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 440 *Mycobacterium leprae* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1115 *Mycobacterium bovis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 7859 *Klebsiella pneumoniae* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 7860 *Klebsiella pneumoniae* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 7861 *Klebsiella pneumoniae* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 97 *Helicobacter pylori* HP0663 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 608 *Helicobacter pylori* J99sp|Q9ZLH1 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 4098 *Haemophilus influenzae* HI0196 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 604 *Haemophilus ducreyi* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 5421 *Escherichia coli* aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2434 *Enterococcus faecium* (DOE) CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1361 *Enterococcus faecalis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)

4_6_1_4 2988 *Enterococcus faecalis* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 747 *Corynebacterium diphtheriae* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2418 *Clostridium difficile* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 1754 *Clostridium acetobutylicum* 20744838_F3_12 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 350 *Chlamydia trachomatis* D/UW-3/Cx EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 815 *Chlamydia pneumoniae* AR39 CP0815 CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 959 *Chlamydia pneumoniae* CWL029 EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 954 *Campylobacter jejuni* aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2766 *Bordetella pertussis* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2767 *Bordetella pertussis* CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 3272 *Bordetella pertussis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 6550 *Bordetella bronchiseptica* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 4_6_1_4 2267 *Bacillus subtilis* aroF CHORISMATE SYNTHASE (EC 4_6_1_4)
 5_1_1_1 5426 *Yersinia pseudotuberculosis* BS-yncD ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 1613 *Yersinia pestis* BS-yncD ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 2894 *Yersinia pestis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 4247 *Vibrio cholerae* El Tor N16961 ORF00521 ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 5137 *Vibrio cholerae* El Tor N16961 ORF01699 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 553 *Treponema pallidum* TP0681 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 807 *Streptococcus pyogenes* alr ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 968 *Streptococcus pneumoniae* trjQ9S3V7 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1255 *Streptococcus mutans* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1917 *Streptococcus equi* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 803 *Staphylococcus aureus* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 3160 *Staphylococcus aureus* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 289 *Salmonella typhimurium* alr ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 353 *Salmonella typhimurium* alnB ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 836 *Salmonella typhi* ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 4309 *Salmonella typhi* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 5450 *Salmonella typhi* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 2480 *Salmonella paratyphi* ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 4201 *Salmonella paratyphi* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 4202 *Salmonella paratyphi* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 4531 *Salmonella paratyphi* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 4532 *Salmonella paratyphi* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1049 *Salmonella enteritidis* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 2481 *Salmonella enteritidis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 4057 *Salmonella enteritidis* ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 93 *Rickettsia prowazekii* RP095 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 7389 *Pseudomonas aeruginosa* dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 8622 *Pseudomonas aeruginosa* alr ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1503 *Porphyromonas gingivalis* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1429 *Pasteurella multocida* alr ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 227 *Neisseria gonorrhoeae* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1315 *Mycobacterium tuberculosis* alr ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 2113 *Mycobacterium leprae* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1378 *Mycobacterium bovis* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 944 *Klebsiella pneumoniae* ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 8459 *Klebsiella pneumoniae* ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 1636 *Helicobacter pylori* HP0941 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 873 *Helicobacter pylori* J99spJQ9ZKQ9 ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 6843 *Haemophilus influenzae* HI1575 ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 239 *Haemophilus ducreyi* EC-dadX ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 1152 *Escherichia coli* dadX ALANINE RACEMASE, CATABOLIC (EC 5_1_1_1)
 5_1_1_1 3939 *Escherichia coli* alr ALANINE RACEMASE, BIOSYNTHETIC (EC 5_1_1_1)
 5_1_1_1 620 *Enterococcus faecium* (DOE) ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 87 *Enterococcus faecalis* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 427 *Corynebacterium diphtheriae* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1906 *Clostridium difficile* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 227 *Clostridium acetobutylicum* 19695375_C3_125 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1291 *Clostridium acetobutylicum* 4094558_C2_32 ALANINE RACEMASE (EC 5_1_1_1)

5_1_1_1 1309 *Campylobacter jejuni* alr ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 579 *Borrelia burgdorferi* BB0160 ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 293 *Bordetella pertussis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1739 *Bordetella pertussis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 2134 *Bordetella pertussis* EC-dadX ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 3639 *Bordetella pertussis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 3718 *Bordetella pertussis* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 6128 *Bordetella bronchiseptica* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 7255 *Bordetella bronchiseptica* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 8867 *Bordetella bronchiseptica* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 9171 *Bordetella bronchiseptica* ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 464 *Bacillus subtilis* dal ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_1 1764 *Bacillus subtilis* yncD ALANINE RACEMASE (EC 5_1_1_1)
 5_1_1_13 6593 *Yersinia pseudotuberculosis* EC-ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 4125 *Yersinia pestis* EC-ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 1691 *Streptococcus mutans* EC-ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 5023 *Salmonella typhimurium* ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 2349 *Salmonella typhi* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 819 *Salmonella paratyphi* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 5124 *Salmonella paratyphi* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 2710 *Salmonella enteritidis* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 3715 *Salmonella enteritidis* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 3057 *Salmonella dublin* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 8018 *Klebsiella pneumoniae* ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 5690 *Escherichia coli* ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 678 *Enterococcus faecium* (DOE) BS-racX ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 660 *Clostridium difficile* EC-ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 1224 *Campylobacter jejuni* Cj0085c ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_13 3438 *Bacillus subtilis* racX ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_3 7651 *Yersinia pseudotuberculosis* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 4041 *Vibrio cholerae* El Tor N16961 ORF00222 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 131 *Treponema pallidum* TP0406 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1264 *Streptococcus pyogenes* glr GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 158 *Streptococcus pneumoniae* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1036 *Streptococcus equi* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2742 *Staphylococcus aureus* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2841 *Salmonella typhimurium* murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2842 *Salmonella typhimurium* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 5444 *Salmonella typhi* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 6224 *Salmonella paratyphi* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1590 *Salmonella dublin* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1905 *Pseudomonas aeruginosa* murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1741 *Porphyromonas gingivalis* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1722 *Pasteurella multocida* murI PROBABLE GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1376 *Neisseria gonorrhoeae* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 4 *Mycobacterium tuberculosis* murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1145 *Mycobacterium leprae* spP46705 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 3367 *Mycobacterium bovis* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 6403 *Klebsiella pneumoniae* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1463 *Helicobacter pylori* HP0549 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 500 *Helicobacter pylori* J99spJQ9ZLT0 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 14629 *Haemophilus influenzae* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 3865 *Escherichia coli* murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1465 *Enterococcus faecium* (DOE) GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2170 *Enterococcus faecalis* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1911 *Corynebacterium diphtheriae* GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 1447 *Clostridium difficile* EC-murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 159 *Clostridium acetobutylicum* 33598802_C3_176 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 986 *Campylobacter jejuni* murI GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 633 *Borrelia burgdorferi* BB0100 GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2673 *Bacillus subtilis* yrpC GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_3 2833 *Bacillus subtilis* racE GLUTAMATE RACEMASE (EC 5_1_1_3)

5_1_1_4 352 *Pseudomonas aeruginosa* PA1268 PROLINE RACEMASE (EC 5_1_1_4)
 5_1_1_4 2134 *Pseudomonas aeruginosa* PA1255 PROLINE RACEMASE (EC 5_1_1_4)
 5_1_1_4 2809 *Clostridium difficile* PROLINE RACEMASE (EC 5_1_1_4)
 5_1_1_7 7986 *Yersinia pseudotuberculosis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2339 *Yersinia pestis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 4010 *Vibrio cholerae* El Tor N16961 ORF00181 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 5803 *Salmonella typhimurium* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 4204 *Salmonella typhi* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 3368 *Salmonella paratyphi* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 4249 *Salmonella enteritidis* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1506 *Salmonella dublin* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 406 *Rickettsia prowazekii* RP415 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2459 *Pseudomonas aeruginosa* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1072 *Pasteurella multocida* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1435 *Neisseria gonorrhoeae* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 3903 *Mycobacterium tuberculosis* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 831 *Mycobacterium leprae* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2079 *Mycobacterium leprae* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2937 *Mycobacterium bovis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 5673 *Klebsiella pneumoniae* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 5674 *Klebsiella pneumoniae* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2 *Helicobacter pylori* HP0566 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 515 *Helicobacter pylori* J99sp/Q9ZLR5 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 8923 *Haemophilus influenzae* H10750 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1132 *Haemophilus ducreyi* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 3715 *Escherichia coli* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1728 *Enterococcus faecium* (DOE) DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1104 *Enterococcus faecalis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1641 *Corynebacterium diphtheriae* DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 151 *Clostridium difficile* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 3401 *Clostridium acetobutylicum* 24271950_C2_12 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 412 *Chlamydia trachomatis* D/UW-3/Cx EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 234 *Chlamydia pneumoniae* AR39 CP0234 DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 471 *Chlamydia pneumoniae* CWL029 EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 2002 *Campylobacter jejuni* dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 1117 *Bordetella pertussis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 8578 *Bordetella bronchiseptica* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_1_7 3212 *Bacillus subtilis* yutL DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_2_2 5250 *Salmonella typhimurium* yfaW MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 5946 *Salmonella typhimurium* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 2063 *Salmonella typhi* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 3955 *Salmonella typhi* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 4182 *Salmonella paratyphi* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 5307 *Salmonella paratyphi* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 1552 *Salmonella enteritidis* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 3488 *Salmonella enteritidis* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 462 *Salmonella dublin* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 3350 *Pseudomonas aeruginosa* PA2215 MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 2690 *Klebsiella pneumoniae* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 2691 *Klebsiella pneumoniae* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 2839 *Klebsiella pneumoniae* MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 2429 *Bordetella pertussis* BS-ytfD MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 5822 *Bordetella bronchiseptica* BS-ytfD MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 8292 *Bordetella bronchiseptica* BS-yitF MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_2 1097 *Bacillus subtilis* yitF MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_3 6205 *Yersinia pseudotuberculosis* EC-fadB FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERASES (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]
 5_1_2_3 1798 *Yersinia pestis* EC-fadB FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERASES

(EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3))

5_1_2_3 5037 *Yersinia pestis* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 6502 *Vibrio cholerae* El Tor N16961 ORF00007 FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 3736 *Salmonella typhimurium* oldB FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 6094 *Salmonella typhimurium* yfcX FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 2836 *Salmonella typhi* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 5398 *Salmonella typhi* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 2792 *Salmonella paratyphi* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 2793 *Salmonella paratyphi* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 2353 *Salmonella enteritidis* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 3560 *Salmonella enteritidis* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 4405 *Salmonella enteritidis* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 2360 *Pseudomonas aeruginosa* PA1737 FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 6348 *Pseudomonas aeruginosa* faoA FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 4295 *Mycobacterium tuberculosis* fadB FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 3177 *Mycobacterium leprae* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 928 *Mycobacterium bovis* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 5004 *Klebsiella pneumoniae* FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 5432 *Escherichia coli* b2341 FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 6215 *Escherichia coli* fadB FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_2_3 3278 *Bacillus subtilis* yusL FATTY OXIDATION COMPLEX ALPHA SUBUNIT [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17); DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA ISOMERAS (EC 5_3_3_8); 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35); 3-HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]

5_1_3_13 1391 *Streptococcus pyogenes* cpsFP DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 1187 *Streptococcus mutans* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 176 *Streptococcus equi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 367 *Streptococcus equi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 6490 *Salmonella typhimurium* rmlC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 904 *Salmonella typhi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 4893 *Salmonella paratyphi* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 889 *Salmonella enteritidis* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 3293 *Salmonella dublin* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 1468 *Pseudomonas aeruginosa* rmlC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 3267 *Pseudomonas aeruginosa* PA4069 DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 1383 *Porphyromonas gingivalis* EC-rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 1967 *Porphyromonas gingivalis* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 704 *Neisseria gonorrhoeae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 2952 *Mycobacterium tuberculosis* rmlC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 3518 *Mycobacterium leprae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 742 *Mycobacterium bovis* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 1661 *Klebsiella pneumoniae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 4831 *Klebsiella pneumoniae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 5233 *Escherichia coli* rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 3490 *Enterococcus faecium* (DOE) DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 513 *Enterococcus faecalis* EC-rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 392 *Corynebacterium diphtheriae* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 2505 *Clostridium acetobutylicum* I367952_C3_18 DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) / DTDP-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)

5_1_3_13 699 *Campylobacter jejuni* Cj1430c DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 3569 *Bordetella pertussis* EC-rfbC DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 7038 *Bordetella bronchiseptica* DTDP-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13)

5_1_3_13 7039 *Bordetella bronchiseptica* DTD-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) /
 DTD-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 5_1_3_13 3775 *Bacillus subtilis* spsK DTD-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC 5_1_3_13) /
 DTD-4-DEHYDRORHAMNOSE REDUCTASE (EC 1_1_1_133)
 5_1_3_20 7704 *Yersinia pseudotuberculosis* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE
 (EC 5_1_3_20)
 5_1_3_20 2110 *Yersinia pestis* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 598 *Vibrio cholerae* El Tor N16961 ORF00337 ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-
 EPIMERASE (EC 5_1_3_20)
 5_1_3_20 375 *Salmonella typhimurium* rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 1922 *Salmonella typhi* ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 5897 *Salmonella paratyphi* ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 504 *Salmonella enteritidis* ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 1158 *Salmonella dublin* ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 6987 *Pseudomonas aeruginosa* rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 457 *Pasteurella multocida* rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 767 *Neisseria gonorrhoeae* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 522 *Klebsiella pneumoniae* ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 279 *Helicobacter pylori* HP0859 ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 792 *Helicobacter pylori* J99tr[Q9ZKY9 ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 12284 *Haemophilus influenzae* HI1114 ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 1253 *Haemophilus ducreyi* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 3539 *Escherichia coli* rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC 5_1_3_20)
 5_1_3_20 1542 *Campylobacter jejuni* waaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 2860 *Bordetella pertussis* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE (EC
 5_1_3_20)
 5_1_3_20 7575 *Bordetella bronchiseptica* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-EPIMERASE
 (EC 5_1_3_20)
 5_1_3_4 6515 *Yersinia pseudotuberculosis* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 944 *Yersinia pestis* trjQ9X6B7 L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1604 *Yersinia pestis* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 892 *Streptococcus pyogenes* araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1047 *Streptococcus pneumoniae* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1295 *Streptococcus equi* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 2751 *Salmonella typhimurium* sgbE L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 2887 *Salmonella typhimurium* araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1895 *Salmonella typhi* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1478 *Salmonella paratyphi* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 3346 *Salmonella enteritidis* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 4254 *Salmonella dublin* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 888 *Pasteurella multocida* araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 346 *Mycoplasma pneumoniae* MP344 L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 4154 *Klebsiella pneumoniae* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 6472 *Klebsiella pneumoniae* L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 16100 *Haemophilus influenzae* HI1025 L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 397 *Haemophilus ducreyi* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 3503 *Escherichia coli* yiaS L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 4311 *Escherichia coli* araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 1085 *Enterococcus faecium* (DOE) L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 3169 *Enterococcus faecium* (DOE) L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 2180 *Enterococcus faecalis* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)
 5_1_3_4 2872 *Bacillus subtilis* araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC 5_1_3_4)

5_1_3_6 4833 *Klebsiella pneumoniae* UDP-GLUCURONATE 4-EPIMERASE (EC 5_1_3_6)
 5_1_3_6 3480 *Enterococcus faecium* (DOE) UDP-GLUCURONATE 4-EPIMERASE (EC 5_1_3_6)
 5_1_3_6 307 *Borrelia burgdorferi* BB0444 UDP-GLUCURONATE 4-EPIMERASE (EC 5_1_3_6)
 5_1_3_6 3081 *Bacillus subtilis* ytcB UDP-GLUCURONATE 4-EPIMERASE (EC 5_1_3_6)
 5_1_3_9 4177 *Yersinia pseudotuberculosis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 4352 *Yersinia pestis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 5578 *Vibrio cholerae* El Tor N16961 ORF02262 N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1790 *Streptococcus pyogenes* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 426 *Streptococcus pneumoniae* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 980 *Streptococcus pneumoniae* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1661 *Streptococcus equi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1844 *Staphylococcus aureus* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 2816 *Salmonella typhimurium* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 6109 *Salmonella typhimurium* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1169 *Salmonella typhi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1170 *Salmonella typhi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 4925 *Salmonella typhi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 2838 *Salmonella paratyphi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 2839 *Salmonella paratyphi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 5265 *Salmonella paratyphi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 5266 *Salmonella paratyphi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 4097 *Salmonella enteritidis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 819 *Salmonella dublin* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1080 *Pasteurella multocida* Q9L6B4 N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 6110 *Klebsiella pneumoniae* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 14337 *Haemophilus influenzae* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 17946 *Haemophilus influenzae* HI0145 N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 407 *Haemophilus ducreyi* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 5885 *Escherichia coli* b3223 N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 2884 *Enterococcus faecium* (DOE) N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 3764 *Enterococcus faecium* (DOE) N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 592 *Enterococcus faecalis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 735 *Enterococcus faecalis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 1842 *Corynebacterium diphtheriae* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 3724 *Clostridium difficile* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_1_3_9 116 *Borrelia burgdorferi* BB0644 N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_2_1_1 165 *Bordetella pertussis* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_1 258 *Bordetella pertussis* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_1 1765 *Bordetella pertussis* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_1 9076 *Bordetella bronchiseptica* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_1 9187 *Bordetella bronchiseptica* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_4 5172 *Vibrio cholerae* El Tor N16961 ORF01738 MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 4075 *Salmonella typhimurium* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 750 *Salmonella typhi* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 1958 *Salmonella paratyphi* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 3460 *Salmonella enteritidis* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 701 *Pseudomonas aeruginosa* PA2473 MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 3468 *Bordetella pertussis* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_2_1_4 7308 *Bordetella bronchiseptica* MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_3_1_12 7695 *Yersinia pseudotuberculosis* EC-uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 4267 *Yersinia pestis* EC-uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 447 *Streptococcus equi* EC-uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 6660 *Salmonella typhimurium* uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 3396 *Salmonella typhi* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 5500 *Salmonella paratyphi* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 5501 *Salmonella paratyphi* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 5502 *Salmonella paratyphi* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 3904 *Salmonella enteritidis* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 4492 *Salmonella dublin* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 4066 *Klebsiella pneumoniae* URONATE ISOMERASE (EC 5_3_1_12)

5_3_1_12 4067 *Klebsiella pneumoniae* URONATE ISOMERASE (EC 5_3_1_12) 5_3_1_12 4068 *Klebsiella pneumoniae* URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 5824 *Escherichia coli* uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 3395 *Enterococcus faecium* (DOE) EC-uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 1104 *Clostridium acetobutylicum* 7207516_C1_50 URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 3993 *Clostridium acetobutylicum* 3953138_C2_3 URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_12 1231 *Bacillus subtilis* yjma URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_14 7797 *Yersinia pseudotuberculosis* EC-rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 411 *Yersinia pestis* EC-rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 788 *Salmonella typhimurium* rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 3301 *Salmonella typhi* L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 411 *Salmonella paratyphi* L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 723 *Salmonella enteritidis* L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 2236 *Salmonella dublin* L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 2538 *Klebsiella pneumoniae* L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 6241 *Escherichia coli* rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 3541 *Enterococcus faecium* (DOE) L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 1296 *Enterococcus faecalis* EC-rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_14 3112 *Bacillus subtilis* yule L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_16 6123 *Yersinia pseudotuberculosis* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2946 *Yersinia pestis* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 4963 *Vibrio cholerae* El Tor N16961 ORF01482 PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1154 *Streptococcus mutans* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1913 *Staphylococcus aureus* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2251 *Salmonella typhimurium* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1639 *Salmonella typhi* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 6193 *Salmonella paratyphi* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 6194 *Salmonella paratyphi* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2828 *Salmonella enteritidis* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2326 *Salmonella dublin* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 6310 *Saccharomyces cerevisiae* HIS6 PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 5365 *Pseudomonas aeruginosa* PA5055 PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 7005 *Pseudomonas aeruginosa* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1895 *Pasteurella multocida* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 118 *Neisseria gonorrhoeae* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 934 *Neisseria gonorrhoeae* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2632 *Mycobacterium tuberculosis* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2963 *Mycobacterium leprae* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2259 *Mycobacterium bovis* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 3960 *Klebsiella pneumoniae* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)

5_3_1_16 4642 *Haemophilus influenzae* HI0473 PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1972 *Escherichia coli* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1807 *Corynebacterium diphtheriae* PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 1147 *Clostridium difficile* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 2126 *Clostridium acetobutylicum* 5110885_C3_41 PHOSPHORIBOSYLFORMIMINO-5-
 AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 900 *Campylobacter jejuni* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 765 *Bordetella pertussis* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 7811 *Bordetella bronchiseptica* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_16 3483 *Bacillus subtilis* hisA PHOSPHORIBOSYLFORMIMINO-5-AMINOIMIDAZOLE
 CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_17 4840 *Yersinia pestis* EC-kdül 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-
 ISOMERASE (EC 5_3_1_17)
 5_3_1_17 5027 *Salmonella typhimurium* kdül 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-
 ISOMERASE (EC 5_3_1_17)
 5_3_1_17 224 *Salmonella typhi* 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE (EC
 5_3_1_17)
 5_3_1_17 5127 *Salmonella paratyphi* 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_17 2705 *Salmonella enteritidis* 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_17 5693 *Escherichia coli* kdül 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_17 2265 *Enterococcus faecium* (DOE) 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-
 ISOMERASE (EC 5_3_1_17)
 5_3_1_17 395 *Enterococcus faecalis* 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_17 1304 *Enterococcus faecalis* 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_17 2210 *Bacillus subtilis* kdül 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-ISOMERASE
 (EC 5_3_1_17)
 5_3_1_22 7681 *Yersinia pseudotuberculosis* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3450 *Yersinia pestis* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3730 *Salmonella typhimurium* ygbM HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 6604 *Salmonella typhimurium* gip HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 1395 *Salmonella typhi* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3719 *Salmonella typhi* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3828 *Salmonella paratyphi* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 5607 *Salmonella paratyphi* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 2208 *Salmonella enteritidis* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3004 *Salmonella enteritidis* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 3824 *Salmonella dublin* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 2836 *Pseudomonas aeruginosa* PA1501 HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 8636 *Pseudomonas aeruginosa* PA0550 HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 334 *Pasteurella multocida* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 6984 *Klebsiella pneumoniae* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 2154 *Haemophilus influenzae* HI1013 HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 491 *Escherichia coli* gip HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 2668 *Escherichia coli* b2739 HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_22 5109 *Bordetella bronchiseptica* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_24 6735 *Yersinia pseudotuberculosis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC
 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2569 *Yersinia pestis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-
 (5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)

5_3_1_24 1507 *Streptococcus pneumoniae* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 803 *Streptococcus mutans* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 804 *Streptococcus mutans* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 3404 *Staphylococcus aureus* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 861 *Salmonella typhimurium* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 393 *Salmonella typhi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2877 *Salmonella paratyphi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2878 *Salmonella paratyphi* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 5680 *Pseudomonas aeruginosa* trpF N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 1537 *Pasteurella multocida* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 1697 *Neisseria gonorrhoeae* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2306 *Klebsiella pneumoniae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 7322 *Klebsiella pneumoniae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 673 *Helicobacter pylori* HP1279 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 1189 *Helicobacter pylori* J99sp|Q9ZJU8 INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 6522 *Haemophilus influenzae* |1574224|sp|P46451|TRPC_HAEIN INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 4843 *Escherichia coli* trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2135 *Corynebacterium diphtheriae* INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2032 *Clostridium acetobutylicum* 34011567_F3_9 N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 312 *Chlamydia trachomatis* D/UW-3/Cx trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2329 *Campylobacter jejuni* trpF N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 3318 *Bordetella pertussis* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 6789 *Bordetella bronchiseptica* EC-trpC N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 1756 *Bacillus subtilis* ynaI N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_24 2261 *Bacillus subtilis* trpF N-(5'-PHOSPHORIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_25 1535 *Streptococcus pneumoniae* EC-fucI L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 5535 *Salmonella typhimurium* fucI L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 3853 *Salmonella typhi* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 6000 *Salmonella paratyphi* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 6001 *Salmonella paratyphi* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 3945 *Salmonella enteritidis* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 1864 *Salmonella dublin* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 4050 *Klebsiella pneumoniae* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 4051 *Klebsiella pneumoniae* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 4052 *Klebsiella pneumoniae* L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 20632 *Haemophilus influenzae* HI0614 L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_25 2733 *Escherichia coli* fucI L-FUCOSE ISOMERASE (EC 5_3_1_25)

5_3_1_26 974 *Yersinia pestis* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC 5_3_1_26)
 5_3_1_26 423 *Streptococcus pyogenes* lacB_1 GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 444 *Streptococcus pyogenes* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 608 *Streptococcus pyogenes* lacA_2 GALACTOSE-6-PHOSPHATE ISOMERASE LACA SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 609 *Streptococcus pyogenes* lacB_2 GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 726 *Streptococcus pneumoniae* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 1826 *Streptococcus pneumoniae* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 102 *Streptococcus mutans* sp|P26423 GALACTOSE-6-PHOSPHATE ISOMERASE LACA SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 103 *Streptococcus mutans* EC-rpiB GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 1355 *Streptococcus mutans* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 543 *Streptococcus equi* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC 5_3_1_26)
 5_3_1_26 544 *Streptococcus equi* GALACTOSE-6-PHOSPHATE ISOMERASE LACA SUBUNIT (EC 5_3_1_26)
 5_3_1_26 1098 *Streptococcus equi* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 2821 *Staphylococcus aureus* sp|P26592 GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT
 (EC 5_3_1_26)
 5_3_1_26 3723 *Staphylococcus aureus* GALACTOSE-6-PHOSPHATE ISOMERASE LACA SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 2808 *Salmonella typhimurium* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 4695 *Salmonella enteritidis* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 1693 *Salmonella dublin* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 3358 *Klebsiella pneumoniae* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 244 *Enterococcus faecalis* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 245 *Enterococcus faecalis* GALACTOSE-6-PHOSPHATE ISOMERASE LACA SUBUNIT (EC
 5_3_1_26)
 5_3_1_26 1920 *Clostridium acetobutylicum* 6698591_C2_34 GALACTOSE-6-PHOSPHATE ISOMERASE LACB
 SUBUNIT (EC 5_3_1_26)
 5_3_1_26 1921 *Clostridium acetobutylicum* 273385_C1_29 GALACTOSE-6-PHOSPHATE ISOMERASE LACA
 SUBUNIT (EC 5_3_1_26)
 5_3_1_26 4162 *Clostridium acetobutylicum* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_4 7514 *Yersinia pseudotuberculosis* EC-araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 987 *Yersinia pestis* EC-araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 295 *Salmonella typhimurium* araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 1894 *Salmonella typhi* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 279 *Salmonella paratyphi* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 280 *Salmonella paratyphi* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 281 *Salmonella paratyphi* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3347 *Salmonella enteritidis* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 4253 *Salmonella dublin* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3788 *Klebsiella pneumoniae* L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 4312 *Escherichia coli* araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3167 *Enterococcus faecium* (DOE) EC-araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 1775 *Clostridium acetobutylicum* 23647187_F3_8 L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3258 *Clostridium acetobutylicum* 4745217_C2_6 L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3259 *Clostridium acetobutylicum* 20751282_C1_4 L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 3964 *Clostridium acetobutylicum* 30195337_F2_1 L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_4 2874 *Bacillus subtilis* araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)

5_3_1_5 6147 *Yersinia pseudotuberculosis* EC-xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 2472 *Yersinia pestis* EC-xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 3150 *Salmonella typhimurium* xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 649 *Salmonella typhi* XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 4512 *Salmonella paratyphi* XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 4513 *Salmonella paratyphi* XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 809 *Salmonella dublin* XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 7393 *Klebsiella pneumoniae* XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 5941 *Haemophilus influenzae* H1112 XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 6084 *Escherichia coli* xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 1968 *Enterococcus faecalis* EC-xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 190 *Clostridium difficile* EC-xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_1_5 1760 *Bacillus subtilis* xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_3_10 3943 *Yersinia pestis* 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 4948 *Salmonella typhimurium* hpcD 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 1288 *Salmonella typhi* 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 1137 *Salmonella paratyphi* 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 496 *Pseudomonas aeruginosa* hpcD 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 6151 *Pseudomonas aeruginosa* PA1966 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 931 *Pasteurella multocida* hpaF 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_10 1143 *Klebsiella pneumoniae* 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-ISOMERASE (EC 5_3_3_10)
 5_3_3_4 311 *Pseudomonas aeruginosa* catC MUCONOLACTONE ISOMERASE (EC 5_3_3_4)
 5_4_1_2 969 *Salmonella typhimurium* cbiC PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 2988 *Salmonella typhi* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 1998 *Salmonella paratyphi* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 2863 *Salmonella enteritidis* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 1515 *Salmonella dublin* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 5844 *Pseudomonas aeruginosa* cobH PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 1219 *Mycobacterium tuberculosis* cobH PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 8951 *Klebsiella pneumoniae* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 1525 *Corynebacterium diphtheriae* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_1_2 926 *Clostridium difficile* PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_2_3 5499 *Yersinia pseudotuberculosis* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 816 *Yersinia pestis* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 4498 *Vibrio cholerae* El Tor N16961 ORF00868 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 434 *Streptococcus pyogenes* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1191 *Streptococcus pneumoniae* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1192 *Streptococcus pneumoniae* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1666 *Streptococcus mutans* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 755 *Streptococcus equi* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 309 *Staphylococcus aureus* [P95685] PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 3580 *Salmonella typhimurium* mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 6855 *Salmonella typhimurium* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-)/PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)/PHOSPHOMANNOMUTASE (EC 5_4_2_8)

5_4_2_3 5363 *Salmonella typhi* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 497 *Salmonella paratyphi* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2824 *Saccharomyces cerevisiae* PCMI PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3)
 5_4_2_3 4535 *Pseudomonas aeruginosa* glmM PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1455 *Pasteurella multocida* mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 800 *Neisseria gonorrhoeae* BS-yhxB PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2923 *Mycobacterium tuberculosis* mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1244 *Mycobacterium leprae*trjQ49869 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2064 *Mycobacterium bovis* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1034 *Helicobacter pylori* HP0075 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 71 *Helicobacter pylori* J99trjQ9ZM22 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 10078 *Haemophilus influenzae* HI1337 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 15164 *Haemophilus influenzae* HI1463 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 1384 *Haemophilus ducreyi* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 5862 *Escherichia coli* mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 3435 *Enterococcus faecium* (DOE) EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2526 *Enterococcus faecalis* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 3560 *Clostridium difficile* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 233 *Clostridium acetobutylicum* 5346062_C2_109 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 779 *Chlamydia trachomatis* D/UW-3/Cx mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 893 *Chlamydia pneumoniae* AR39 CP0893 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 893 *Chlamydia pneumoniae* CWL029 pgm PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2342 *Campylobacter jejuni* Cj0360 PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 2677 *Bordetella pertussis* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 6545 *Bordetella bronchiseptica* PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_3 177 *Bacillus subtilis* ybbT PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_-) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)
 5_4_2_6 963 *Neisseria gonorrhoeae* BS-yvdM BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1307 *Mycobacterium tuberculosis* Rv3400 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1219 *Mycobacterium leprae*spjQ49741 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2753 *Mycobacterium leprae* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1277 *Escherichia coli* b1317 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2077 *Enterococcus faecium* (DOE) BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2099 *Enterococcus faecium* (DOE) BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2511 *Enterococcus faecium* (DOE) BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 895 *Enterococcus faecalis* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2037 *Enterococcus faecalis* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2784 *Enterococcus faecalis* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)

5_4_2_6 517 *Clostridium difficile* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1119 *Clostridium difficile* BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 148 *Clostridium acetobutylicum* 14876450_F3_82 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 704 *Clostridium acetobutylicum* 33242942_C2_87 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1658 *Clostridium acetobutylicum* 4689375_F1_1 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 1870 *Clostridium acetobutylicum* 23471078_C3_38 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 2187 *Clostridium acetobutylicum* 417_C3_22 BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_6 3450 *Bacillus subtilis* yvdM BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_7 7525 *Yersinia pseudotuberculosis* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1288 *Yersinia pestis* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 6115 *Vibrio cholerae* El Tor N16961 ORF02977 PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 332 *Streptococcus pyogenes* deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 333 *Streptococcus pneumoniae* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 510 *Streptococcus mutans* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1450 *Streptococcus equi* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1893 *Staphylococcus aureus* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 2603 *Salmonella typhimurium* deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 3567 *Salmonella typhi* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1186 *Salmonella paratyphi* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1187 *Salmonella paratyphi* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 4036 *Salmonella enteritidis* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 4582 *Salmonella enteritidis* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 2152 *Salmonella dublin* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1818 *Klebsiella pneumoniae* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1819 *Klebsiella pneumoniae* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 577 *Helicobacter pylori* HP1179 PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 1095 *Helicobacter pylori* J99 deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 4265 *Escherichia coli* deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 5975 *Escherichia coli* yhfW PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 2348 *Enterococcus faecium* (DOE) PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 458 *Enterococcus faecalis* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 3069 *Clostridium difficile* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 4026 *Clostridium acetobutylicum* PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_7 2346 *Bacillus subtilis* drm PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_9 7116 *Bordetella bronchiseptica* PHOSPHOENOLPYRUVATE PHOSPHOMUTASE PRECURSOR (EC 5_4_2_9)
 5_4_3_2 6168 *Yersinia pseudotuberculosis* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 831 *Yersinia pestis* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 6409 *Vibrio cholerae* El Tor N16961 ORF03362 L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 7 *Treponema pallidum* TP0121 L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 3062 *Salmonella typhimurium* yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 151 *Salmonella typhi* L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 4084 *Salmonella paratyphi* L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 4085 *Salmonella paratyphi* LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 1021 *Salmonella enteritidis* L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 1181 *Porphyromonas gingivalis* BS-yodO L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 487 *Pasteurella multocida* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 4972 *Klebsiella pneumoniae* L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 7957 *Haemophilus influenzae* HI0329 L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 1003 *Haemophilus ducreyi* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 6357 *Escherichia coli* yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 658 *Clostridium difficile* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_2 1966 *Bacillus subtilis* yodO L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_3 1523 *Porphyromonas gingivalis* D-LYSINE 5,6-AMINOMUTASE BETA SUBUNIT (EC 5_4_3_3)
 5_4_3_3 1524 *Porphyromonas gingivalis* D-LYSINE 5,6-AMINOMUTASE ALPHA SUBUNIT (EC 5_4_3_3)
 5_4_3_8 6619 *Yersinia pseudotuberculosis* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 3773 *Yersinia pestis* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 4485 *Vibrio cholerae* El Tor N16961 ORF00853 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)

5_4_3_8 1366 *Staphylococcus aureus* Q9RL9I GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 2509 *Staphylococcus aureus* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE 2 (EC 5_4_3_8)
 5_4_3_8 488 *Salmonella typhimurium* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1548 *Salmonella typhi* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 4652 *Salmonella paratyphi* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1819 *Salmonella enteritidis* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 4535 *Salmonella dublin* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1163 *Pseudomonas aeruginosa* PA5523 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1873 *Pseudomonas aeruginosa* PA4088 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 8466 *Pseudomonas aeruginosa* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1477 *Pasteurella multocida* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1481 *Neisseria gonorrhoeae* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 2171 *Mycobacterium tuberculosis* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 334 *Mycobacterium leprae* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 3400 *Mycobacterium bovis* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 2919 *Klebsiella pneumoniae* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 2920 *Klebsiella pneumoniae* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 3091 *Klebsiella pneumoniae* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1253 *Helicobacter pylori* HP0306 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 296 *Helicobacter pylori* J99sp|Q9ZMD0 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 4355 *Escherichia coli* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 146 *Corynebacterium diphtheriae* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 440 *Clostridium acetobutylicum* 24337932_C2_81 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 201 *Chlamydia trachomatis* D/UW-3/Cx EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 634 *Chlamydia pneumoniae* AR39 CP0634 GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 125 *Chlamydia pneumoniae* CWL029 EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 353 *Campylobacter jejuni* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 1008 *Bordetella pertussis* GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 3748 *Bordetella pertussis* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 7780 *Bordetella bronchiseptica* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 870 *Bacillus subtilis* gsaB GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_3_8 2806 *Bacillus subtilis* hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-AMINOMUTASE (EC 5_4_3_8)
 5_4_99_16 1514 *Salmonella typhimurium* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 4299 *Salmonella typhi* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 3515 *Salmonella paratyphi* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 4257 *Salmonella enteritidis* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 2127 *Salmonella dublin* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 2334 *Salmonella dublin* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 3213 *Pseudomonas aeruginosa* PA2162 MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)

5_4_99_16 1184 *Mycobacterium tuberculosis* glgY MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 6 *Mycobacterium bovis* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 1323 *Bordetella pertussis* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_16 9712 *Bordetella bronchiseptica* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC 5_4_99_16)
 5_4_99_5 6915 *Yersinia pseudotuberculosis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 6916 *Yersinia pseudotuberculosis* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 7354 *Yersinia pseudotuberculosis* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 2149 *Yersinia pestis* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 2830 *Yersinia pestis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 3648 *Yersinia pestis* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 4554 *Vibrio cholerae* El Tor N16961 ORF00940 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 4563 *Vibrio cholerae* El Tor N16961 ORF00951 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 1076 *Streptococcus pyogenes* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 443 *Streptococcus equi* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2048 *Staphylococcus aureus* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2181 *Staphylococcus aureus* BS-pheB CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 3905 *Salmonella typhimurium* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 3907 *Salmonella typhimurium* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 5163 *Salmonella typhimurium* aroQ MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 681 *Salmonella typhi* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 1837 *Salmonella typhi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 4595 *Salmonella typhi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 1601 *Salmonella paratyphi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 1603 *Salmonella paratyphi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 5702 *Salmonella paratyphi* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 79 *Salmonella enteritidis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 87 *Salmonella enteritidis* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 739 *Salmonella enteritidis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 1797 *Salmonella dublin* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 987 *Saccharomyces cerevisiae* ARO7 CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 6949 *Saccharomyces cerevisiae* TYR1 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 3027 *Pseudomonas aeruginosa* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 400 *Porphyromonas gingivalis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 572 *Pasteurella multocida* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)

5_4_99_5 1599 *Pasteurella multocida* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 802 *Neisseria gonorrhoeae* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 1366 *Neisseria gonorrhoeae* pQ9ZHY3 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 4074 *Mycobacterium tuberculosis* Rv1885c MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 602 *Mycobacterium bovis* MONOFUNCTIONAL CHORISMATE MUTASE PRECURSOR (EC 5_4_99_5)
 5_4_99_5 7342 *Klebsiella pneumoniae* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 280 *Helicobacter pylori* J99trQ9ZME4 CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 5998 *Haemophilus influenzae* HII145 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 10001 *Haemophilus influenzae* HII290 CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 281 *Haemophilus ducreyi* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 764 *Haemophilus ducreyi* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 765 *Haemophilus ducreyi* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 2535 *Escherichia coli* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 4327 *Escherichia coli* b0105 POSSIBLE CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 5568 *Escherichia coli* tyrA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 5_4_99_5 2436 *Enterococcus faecium* (DOE) PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 1359 *Enterococcus faecalis* BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 1995 *Clostridium difficile* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2417 *Clostridium difficile* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 2421 *Clostridium difficile* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 1750 *Clostridium acetobutylicum* 954438_F2_8 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 3246 *Clostridium acetobutylicum* 23991642_C2_11 CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 363 *Chlamydia trachomatis* D/UW-3/Cx BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 270 *Chlamydia pneumoniae* AR39 CP0270 PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 440 *Chlamydia pneumoniae* CWL029 BS-aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2276 *Campylobacter jejuni* pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 195 *Bordetella pertussis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 2692 *Bordetella pertussis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 2694 *Bordetella pertussis* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 7356 *Bordetella bronchiseptica* CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_5 2265 *Bacillus subtilis* aroH CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2785 *Bacillus subtilis* pheB CHORISMATE MUTASE (EC 5_4_99_5)
 5_4_99_5 2969 *Bacillus subtilis* aroA PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE (EC 4_1_2_15) / CHORISMATE MUTASE (EC 5_4_99_5)

5_4_99_6 8095 *Yersinia pseudotuberculosis* EC-menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 878 *Yersinia pestis* EC-menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 4628 *Vibrio cholerae* El Tor N16961 ORF01035 ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 5771 *Vibrio cholerae* El Tor N16961 ORF02494 MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 2270 *Staphylococcus aureus* EC-menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 1182 *Salmonella typhimurium* entC ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 4345 *Salmonella typhimurium* menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 3027 *Salmonella typhi* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 3583 *Salmonella typhi* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 927 *Salmonella paratyphi* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 1816 *Salmonella paratyphi* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 2921 *Salmonella paratyphi* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 3967 *Salmonella enteritidis* ISOCHORISMATE SYNTHASE ENTC (EC 5_4_99_6)
 5_4_99_6 4102 *Salmonella enteritidis* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 496 *Salmonella dublin* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 6495 *Pseudomonas aeruginosa* pchA MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 966 *Pasteurella multocida* menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 1562 *Mycobacterium tuberculosis* entC ISOCHORISMATE SYNTHASE ENTC (EC 5_4_99_6)
 5_4_99_6 1787 *Mycobacterium leprae* EC-entC ISOCHORISMATE SYNTHASE ENTC (EC 5_4_99_6)
 5_4_99_6 2115 *Mycobacterium bovis* EC-entC ISOCHORISMATE SYNTHASE ENTC (EC 5_4_99_6)
 5_4_99_6 1479 *Klebsiella pneumoniae* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 1480 *Klebsiella pneumoniae* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 4359 *Klebsiella pneumoniae* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 4360 *Klebsiella pneumoniae* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 4361 *Klebsiella pneumoniae* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 4362 *Klebsiella pneumoniae* ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 6382 *Klebsiella pneumoniae* MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 14026 *Haemophilus influenzae* HI0285 MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 237 *Haemophilus ducreyi* EC-menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 574 *Escherichia coli* entC ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_6 5373 *Escherichia coli* menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 2538 *Enterococcus faecalis* BS-menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 1938 *Corynebacterium diphtheriae* ISOCHORISMATE SYNTHASE ENTC (EC 5_4_99_6)
 5_4_99_6 3077 *Bacillus subtilis* menF MENAQUINONE-SPECIFIC ISOCHORISMATE SYNTHASE (EC 5_4_99_6)
 5_4_99_6 3194 *Bacillus subtilis* dhbc ISOCHORISMATE SYNTHASE DHBC (EC 5_4_99_6)
 5_4_99_9 5269 *Salmonella typhimurium* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 3335 *Salmonella typhi* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 5734 *Salmonella paratyphi* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 558 *Mycoplasma pneumoniae* MP558 UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 247 *Mycoplasma genitalium* MG137 UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 3216 *Mycobacterium tuberculosis* glf UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 3057 *Mycobacterium leprae* EC-yefE UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 2487 *Mycobacterium bovis* EC-yefE UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 2750 *Mycobacterium bovis* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)

5_4_99_9 5231 *Escherichia coli* yefE UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 1338 *Enterococcus faecalis* EC-yefE UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 1469 *Corynebacterium diphtheriae* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 2453 *Clostridium acetobutylicum* 3945463_C2_30 UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_4_99_9 717 *Campylobacter jejuni* glf UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_5_1_1 310 *Pseudomonas aeruginosa* catB MUONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_1 94 *Porphyromonas gingivalis* BS-ykfB MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 3274 *Mycobacterium tuberculosis* menC MUONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_1 3301 *Mycobacterium leprae* EC-menC MUONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_1 2657 *Mycobacterium bovis* MUONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_1 2302 *Klebsiella pneumoniae* MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 2303 *Klebsiella pneumoniae* MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 2304 *Klebsiella pneumoniae* MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 2937 *Enterococcus faecalis* BS-ykfB MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 869 *Corynebacterium diphtheriae* MUONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_1 1468 *Clostridium difficile* EC-menC MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 500 *Clostridium acetobutylicum* 24226692_C3_67 MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_1 1299 *Bacillus subtilis* ykfB MUONATE CYCLOISOMERASE I (EC 5_5_1_1)
 5_5_1_2 2128 *Pseudomonas aeruginosa* pcaB 3-CARBOXY-CIS,CIS-MUONATE CYCLOISOMERASE (EC 5_5_1_2)
 5_5_1_5 7814 *Yersinia pseudotuberculosis* EC-ybhE CARBOXY-CIS,CIS-MUONATE CYCLASE (EC 5_5_1_5)
 5_5_1_5 3361 *Staphylococcus aureus* EC-ybhE CARBOXY-CIS,CIS-MUONATE CYCLASE (EC 5_5_1_5)
 5_5_1_5 103 *Neurospora crassa* AAA21020_1 CARBOXY-CIS,CIS-MUONATE CYCLASE (EC 5_5_1_5)
 5_5_1_5 2941 *Klebsiella pneumoniae* CARBOXY-CIS,CIS-MUONATE CYCLASE (EC 5_5_1_5)
 5_5_1_7 7476 *Yersinia pseudotuberculosis* BS-ykfB CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 1725 *Yersinia pestis* BS-ykfB CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 5621 *Salmonella typhimurium* ycjG CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 2411 *Salmonella typhi* CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 6122 *Salmonella paratyphi* CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 6123 *Salmonella paratyphi* CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 1422 *Klebsiella pneumoniae* CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 1423 *Klebsiella pneumoniae* CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 5_5_1_7 1285 *Escherichia coli* b1325 CHLOROMUONATE CYCLOISOMERASE (EC 5_5_1_7)
 6_2_1_12 8479 *Pseudomonas aeruginosa* PA3860 4-COUMARATE--COA LIGASE 2 (EC 6_2_1_12)
 6_2_1_12 2377 *Mycobacterium tuberculosis* fadD8 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 3637 *Mycobacterium tuberculosis* fadD5 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 4593 *Mycobacterium tuberculosis* fadD35 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 5654 *Mycobacterium tuberculosis* fadD36 4-COUMARATE--COA LIGASE 1 (EC 6_2_1_12)
 6_2_1_12 1107 *Mycobacterium leprae* Q50017 4-COUMARATE--COA LIGASE 1 (EC 6_2_1_12)
 6_2_1_12 2356 *Mycobacterium bovis* BS-lcfA 4-COUMARATE--COA LIGASE 1 (EC 6_2_1_12)
 6_2_1_12 2655 *Mycobacterium bovis* 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 2954 *Mycobacterium bovis* 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 2091 *Corynebacterium diphtheriae* 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 2688 *Bordetella pertussis* 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 5696 *Bordetella bronchiseptica* 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 7227 *Bordetella bronchiseptica* 4-COUMARATE--COA LIGASE 2 (EC 6_2_1_12)
 6_2_1_12 1027 *Bacillus subtilis* yhfL 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_12 1824 *Bacillus subtilis* yngI 4-COUMARATE--COA LIGASE (EC 6_2_1_12)
 6_2_1_14 6490 *Yersinia pseudotuberculosis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 1665 *Yersinia pestis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 7080 *Vibrio cholerae* El Tor N16961ORFA00232 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3269 *Staphylococcus aureus* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3700 *Staphylococcus aureus* BS-bioW 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5072 *Salmonella typhimurium* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 6891 *Salmonella typhimurium* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 4635 *Salmonella typhi* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3031 *Salmonella paratyphi* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3032 *Salmonella paratyphi* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3248 *Salmonella dublin* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)

6_2_1_14 6742 *Pseudomonas aeruginosa* PA4978 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 7178 *Pseudomonas aeruginosa* pauA 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 554 *Porphyromonas gingivalis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5515 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5516 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5517 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5518 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5519 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5520 *Klebsiella pneumoniae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 2524 *Escherichia coli* b2584 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 2008 *Corynebacterium diphtheriae* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 1623 *Clostridium difficile* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 66 *Bordetella pertussis* giJ313841 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 627 *Bordetella pertussis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 2312 *Bordetella pertussis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 2547 *Bordetella pertussis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 2628 *Bordetella pertussis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3058 *Bordetella pertussis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5070 *Bordetella bronchiseptica* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5093 *Bordetella bronchiseptica* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5701 *Bordetella bronchiseptica* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 5852 *Bordetella bronchiseptica* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 9692 *Bordetella bronchiseptica* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_14 3018 *Bacillus subtilis* bioW 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_17 5165 *Vibrio cholerae* El Tor N16961 ORF01729 propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 4760 *Salmonella typhimurium* prpE propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 2272 *Salmonella typhi* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 3657 *Salmonella paratyphi* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 3658 *Salmonella paratyphi* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 3659 *Salmonella paratyphi* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 3437 *Salmonella enteritidis* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 4711 *Pseudomonas aeruginosa* PA3568 propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 319 *Escherichia coli* b0335 propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 2252 *Bordetella pertussis* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_17 5171 *Bordetella bronchiseptica* propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_21 1358 *Escherichia coli* b1398 phenylacetate--CoA ligase (EC 6_2_1_21)
 6_2_1_22 4651 *Vibrio cholerae* El Tor N16961 ORF01068 [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 291 *Streptococcus pyogenes* citC [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 1476 *Streptococcus mutans* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 188 *Streptococcus equi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 3279 *Salmonella typhimurium* citC [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 3631 *Salmonella typhimurium* citC [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 2136 *Salmonella typhi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 4546 *Salmonella typhi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 2524 *Salmonella paratyphi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 2525 *Salmonella paratyphi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 2941 *Salmonella paratyphi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 267 *Salmonella enteritidis* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 3168 *Salmonella enteritidis* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 3106 *Salmonella dublin* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 3561 *Salmonella dublin* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 116 *Klebsiella pneumoniae* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 21804 *Haemophilus influenzae* HI0025 [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 630 *Haemophilus ducreyi* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 4552 *Escherichia coli* b0618 [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_22 1014 *Enterococcus faecalis* [CITRATE (PRO-3S) -LYASE] LIGASE (EC 6_2_1_22)
 6_2_1_25 538 *Mycobacterium tuberculosis* fadD22 BENZOATE-COENZYME A LIGASE (EC 6_2_1_25)
 6_2_1_25 204 *Mycobacterium bovis* BENZOATE-COENZYME A LIGASE (EC 6_2_1_25)
 6_2_1_25 1004 *Bordetella pertussis* BENZOATE-COENZYME A LIGASE (EC 6_2_1_25)
 6_2_1_25 6627 *Bordetella bronchiseptica* BENZOATE-COENZYME A LIGASE (EC 6_2_1_25)

6_2_1_26 8100 *Yersinia pseudotuberculosis* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 2267 *Yersinia pestis* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 5766 *Vibrio cholerae* El Tor N16961 ORF02487 O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 3507 *Staphylococcus aureus*sp|Q53634 O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 127 *Salmonella typhimurium* menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 2636 *Salmonella typhi* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 862 *Salmonella paratyphi* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 863 *Salmonella paratyphi* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 145 *Salmonella enteritidis* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 4692 *Salmonella dublin* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 93 *Porphyromonas gingivalis* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 628 *Pasteurella multocida* menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 2195 *Mycobacterium tuberculosis* menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 1074 *Mycobacterium leprae*sp|Q50170 O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 2823 *Mycobacterium bovis* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 3695 *Klebsiella pneumoniae* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 3696 *Klebsiella pneumoniae* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 7649 *Haemophilus influenzae* H10194 O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 607 *Haemophilus ducreyi* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 5368 *Escherichia coli* menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 2537 *Enterococcus faecalis* BS-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 99 *Corynebacterium diphtheriae* O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_26 3073 *Bacillus subtilis* menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC 6_2_1_26)
 6_2_1_5 5649 *Yersinia pseudotuberculosis* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 5650 *Yersinia pseudotuberculosis* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 138 *Yersinia pestis* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 4283 *Yersinia pestis* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 5878 *Vibrio cholerae* El Tor N16961 ORF02630 SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 5879 *Vibrio cholerae* El Tor N16961 ORF02632 SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 2985 *Staphylococcus aureus* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 4455 *Salmonella typhimurium* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 4456 *Salmonella typhimurium* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 463 *Salmonella typhi* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 4242 *Salmonella typhi* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 4856 *Salmonella paratyphi* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 4857 *Salmonella paratyphi* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 4858 *Salmonella paratyphi* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 3751 *Salmonella enteritidis* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 3752 *Salmonella enteritidis* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 1873 *Salmonella dublin* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 2802 *Salmonella dublin* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 423 *Rickettsia prowazekii* RP432 SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 424 *Rickettsia prowazekii* RP433 SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 1727 *Pseudomonas aeruginosa* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 8108 *Pseudomonas aeruginosa* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 401 *Pasteurella multocida* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 402 *Pasteurella multocida* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 846 *Neisseria gonorrhoeae* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 847 *Neisseria gonorrhoeae* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 42 *Mycobacterium tuberculosis* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 43 *Mycobacterium tuberculosis* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 1680 *Mycobacterium leprae* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 2334 *Mycobacterium leprae* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 2575 *Mycobacterium bovis* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 2576 *Mycobacterium bovis* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)

6_2_1_5 3990 *Klebsiella pneumoniae* SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 3991 *Klebsiella pneumoniae* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 3992 *Klebsiella pneumoniae* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 2556 *Haemophilus influenzae* H11197 SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 6118 *Haemophilus influenzae* H11196 SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 304 *Escherichia coli* b0320 SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 702 *Escherichia coli* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 703 *Escherichia coli* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 2444 *Enterococcus faecalis* SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 785 *Chlamydia trachomatis* D/UW-3/Cx EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 786 *Chlamydia trachomatis* D/UW-3/Cx sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 885 *Chlamydia pneumoniae* AR39 CP0885 SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 886 *Chlamydia pneumoniae* AR39 CP0886 SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 899 *Chlamydia pneumoniae* CWL029 EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 900 *Chlamydia pneumoniae* CWL029 sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 1484 *Campylobacter jejuni* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 1485 *Campylobacter jejuni* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 557 *Bordetella pertussis* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 558 *Bordetella pertussis* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 8262 *Bordetella bronchiseptica* EC-sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_5 8263 *Bordetella bronchiseptica* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 1609 *Bacillus subtilis* sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC 6_2_1_5)
 6_2_1_5 1610 *Bacillus subtilis* sucD SUCCINYL-COA SYNTHETASE ALPHA CHAIN (EC 6_2_1_5)
 6_2_1_6 4151 *Pseudomonas aeruginosa* PA1188 GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 4176 *Pseudomonas aeruginosa* PA3733 GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 6001 *Pseudomonas aeruginosa* PA3592 GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 48 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 962 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 1332 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 1436 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 1508 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 1701 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 2326 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 2885 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 2886 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 3167 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 3197 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 4023 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 4232 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 4464 *Bordetella pertussis* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 5387 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 5650 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 6166 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 7019 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 7543 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 7817 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 8319 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 8328 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_6 8996 *Bordetella bronchiseptica* GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_8 5444 *Escherichia coli* b2371 FORMATE--COA LIGASE (EC 6_2_1_8)
 6_3_1_1 5949 *Yersinia pseudotuberculosis* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 2452 *Yersinia pestis* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 503 *Ureaplasma urealyticum* UU363 ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 1021 *Treponema pallidum* TP0556 ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 1438 *Streptococcus pyogenes* asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)

6_3_1_1 1779 *Streptococcus pneumoniae* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 127 *Streptococcus equi* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 2119 *Salmonella typhimurium* asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 5471 *Salmonella typhi* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 5099 *Salmonella paratyphi* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 744 *Salmonella enteritidis* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 1715 *Salmonella dublin* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 15 *Pasteurella multocida* asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 2774 *Klebsiella pneumoniae* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 2775 *Klebsiella pneumoniae* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 8473 *Haemophilus influenzae* HI0564 ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 52 *Haemophilus ducreyi* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 3662 *Escherichia coli* asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 1774 *Clostridium difficile* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 2452 *Clostridium difficile* ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_1 8 6658 *Salmonella typhimurium* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 3398 *Salmonella typhi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 5497 *Salmonella paratyphi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 5498 *Salmonella paratyphi* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 3827 *Salmonella enteritidis* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 4494 *Salmonella dublin* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) (GLUTATHIONE:SPERMIDINE LIGASE [ADP-FORMING]) (GSP SYNTHETASE) ; GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78) (GLUTATHIONYLSPERMIDINE AMIDOHYDROLASE [SPERMIDINE-FORMING]) (GSP AMIDASE)]
 6_3_1_8 4641 *Klebsiella pneumoniae* BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_1_8 5772 *Escherichia coli* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_2_1 7187 *Yersinia pseudotuberculosis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 4941 *Yersinia pestis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 4450 *Vibrio cholerae* El Tor N16961 ORF00812 PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 3010 *Staphylococcus aureus* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1985 *Salmonella typhimurium* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2469 *Salmonella typhi* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 7407 *Salmonella paratyphi* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2578 *Salmonella dublin* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 3574 *Saccharomyces cerevisiae* YIL145C PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 7778 *Pseudomonas aeruginosa* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 307 *Porphyromonas gingivalis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1189 *Neisseria gonorrhoeae* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2982 *Mycobacterium tuberculosis* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 3412 *Mycobacterium leprae* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1832 *Klebsiella pneumoniae* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1833 *Klebsiella pneumoniae* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1834 *Klebsiella pneumoniae* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 972 *Helicobacter pylori* HP0006 PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 6 *Helicobacter pylori* J99sp/Q9ZN52 PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 4340 *Escherichia coli* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1076 *Enterococcus faecium* (DOE) PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)

6_3_2_1 3270 *Enterococcus faecium* (DOE) PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 1844 *Enterococcus faecalis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 352 *Corynebacterium diphtheriae* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2138 *Corynebacterium diphtheriae* PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 224 *Clostridium difficile* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 998 *Clostridium acetobutylicum* 26594013_C3_55 PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2251 *Campylobacter jejuni* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 3188 *Bordetella pertussis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 9018 *Bordetella bronchiseptica* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_1 2238 *Bacillus subtilis* panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_12 5479 *Yersinia pseudotuberculosis* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 6763 *Yersinia pseudotuberculosis* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 4105 *Yersinia pestis* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 4831 *Vibrio cholerae* El Tor N16961 ORF01324 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 880 *Treponema pallidum* TP0340 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 154 *Streptococcus pyogenes* folC_2 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 941 *Streptococcus pyogenes* folC_1 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 610 *Streptococcus pneumoniae* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1669 *Streptococcus pneumoniae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 729 *Streptococcus mutans* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 122 *Streptococcus equi* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2225 *Staphylococcus aureus* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2599 *Staphylococcus aureus* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1337 *Salmonella typhimurium* dedC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 5193 *Salmonella typhi* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 777 *Salmonella paratyphi* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 6471 *Salmonella paratyphi* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2567 *Salmonella dublin* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 425 *Saccharomyces cerevisiae* FOL3 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 943 *Saccharomyces cerevisiae* RMA1 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 8159 *Saccharomyces cerevisiae* MET7 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 519 *Rickettsia prowazekii* RP536 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 5472 *Pseudomonas aeruginosa* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1022 *Porphyromonas gingivalis* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 135 *Pasteurella multocida* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)

6_3_2_12 71 *Neurospora crassa* met6+ FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1691 *Neisseria gonorrhoeae* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 5856 *Mycobacterium tuberculosis* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1835 *Mycobacterium leprae* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1710 *Mycobacterium bovis* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1400 *Klebsiella pneumoniae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1401 *Klebsiella pneumoniae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1402 *Klebsiella pneumoniae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1403 *Klebsiella pneumoniae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 922 *Helicobacter pylori* HP1545 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1443 *Helicobacter pylori* J99 folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2675 *Haemophilus influenzae* HI261 FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 965 *Haemophilus ducreyi* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 5409 *Escherichia coli* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2073 *Enterococcus faecium* (DOE) FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 896 *Enterococcus faecalis* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 593 *Corynebacterium diphtheriae* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1193 *Clostridium difficile* EC-folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 912 *Clostridium acetobutylicum* 25663567_C1_66 FOLYLPOLYGLUTAMATE SYNTHASE (EC
 6_3_2_17) / DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1646 *Campylobacter jejuni* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 1832 *Bordetella pertussis* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_12 2802 *Bacillus subtilis* folC FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_13 5376 *Yersinia pseudotuberculosis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 5784 *Yersinia pseudotuberculosis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 4737 *Yersinia pestis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 4738 *Yersinia pestis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 4739 *Yersinia pestis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 683 *Vibrio cholerae* El Tor N16961 ORF03043 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 700 *Treponema pallidum* TP0933 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 626 *Streptococcus pyogenes* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 955 *Streptococcus pyogenes* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)

6_3_2_13 479 *Streptococcus pneumoniae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1664 *Streptococcus pneumoniae* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1341 *Streptococcus mutans* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1405 *Streptococcus mutans* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1669 *Streptococcus mutans* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 748 *Streptococcus equi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1104 *Streptococcus equi* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3068 *Staphylococcus aureus* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2366 *Salmonella typhimurium* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 101 *Salmonella typhi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3894 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3895 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3896 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2620 *Salmonella enteritidis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 576 *Rickettsia prowazekii* RP597 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 6739 *Pseudomonas aeruginosa* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1145 *Porphyromonas gingivalis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 585 *Pasteurella multocida* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 642 *Pasteurella multocida* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 361 *Neisseria gonorrhoeae* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3875 *Mycobacterium tuberculosis* Rv3712 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 5809 *Mycobacterium tuberculosis* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1370 *Mycobacterium lepraetr* O69522 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2874 *Mycobacterium leprae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2875 *Mycobacterium leprae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1122 *Mycobacterium bovis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3532 *Mycobacterium bovis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1988 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1990 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 875 *Helicobacter pylori* HP1494 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1374 *Helicobacter pylori* J99sp/Q9ZJC6 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)

6_3_2_13 9664 *Haemophilus influenzae* HI133 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--
 2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1416 *Haemophilus ducreyi* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 85 *Escherichia coli* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1598 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3085 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3339 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 682 *Enterococcus faecalis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2644 *Enterococcus faecalis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2848 *Enterococcus faecalis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 207 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 947 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 791 *Clostridium difficile* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1792 *Clostridium acetobutylicum* 24250290_C1_38 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2723 *Clostridium acetobutylicum* 1461635_F1_2 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 2875 *Clostridium acetobutylicum* 25587787_F2_2 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3172 *Clostridium acetobutylicum* 7243807_F2_4 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 4016 *Clostridium acetobutylicum* 15835900_F2_1 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 257 *Chlamydia trachomatis* D/UW-3/Cx EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 336 *Chlamydia pneumoniae* AR39 CP0336 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 378 *Chlamydia pneumoniae* CWL029 EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 965 *Campylobacter jejuni* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 539 *Borrelia burgdorferi* BB0201 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1256 *Bordetella pertussis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 3977 *Bordetella pertussis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 6814 *Bordetella bronchiseptica* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 7664 *Bordetella bronchiseptica* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--
 2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_13 1519 *Bacillus subtilis* murE UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMATE--2,6-
 DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_15 5375 *Yersinia pseudotuberculosis* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-
 2,6-DIAMINOPIMELATE--D-ALANYL-D-ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1164 *Yersinia pestis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-
 DIAMINOPIMELATE--D-ALANYL-D-ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 6172 *Vibrio cholerae* El Tor N16961 ORF03042 UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D-ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 243 *Treponema pallidum* TP0386 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-
 DIAMINOPIMELATE--D-ALANYL-D-ALANYL LIGASE (EC 6_3_2_15)

6_3_2_15 456 *Streptococcus pyogenes* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1648 *Streptococcus pneumoniae* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 746 *Streptococcus mutans* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 33 *Streptococcus equi* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 2369 *Salmonella typhimurium* mra UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 141 *Salmonella typhi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 3897 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 3898 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 2619 *Salmonella enteritidis* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 4344 *Salmonella dublin* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 575 *Rickettsia prowazekii* RP596 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 4749 *Pseudomonas aeruginosa* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1494 *Porphyromonas gingivalis* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 584 *Pasteurella multocida* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1596 *Neisseria gonorrhoeae* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 5158 *Mycobacterium tuberculosis* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1934 *Mycobacterium leprae*trjO69556 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1050 *Mycobacterium bovis* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1991 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 167 *Helicobacter pylori* HP0740 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 677 *Helicobacter pylori* J99trjQ9ZLA3 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 2427 *Haemophilus influenzae* HI1134 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1417 *Haemophilus ducreyi* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 86 *Escherichia coli* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 2457 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 84 *Enterococcus faecalis* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 208 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1163 *Clostridium difficile* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 1791 *Clostridium acetobutylicum* 198578_C1_39 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 4018 *Clostridium acetobutylicum* 48828124_C3_6 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 725 *Chlamydia trachomatis* D/UW-3/Cx murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)

6_3_2_15 967 *Chlamydia pneumoniae* AR39 CP0967 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 831 *Chlamydia pneumoniae* CWL029 EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 449 *Campylobacter jejuni* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 437 *Borrelia burgdorferi* BB0304 UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 7511 *Bordetella bronchiseptica* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_15 457 *Bacillus subtilis* murF UDP-N-ACETYLMURAMOYLALANYL-D-GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D- ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_4 7935 *Yersinia pseudotuberculosis* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 463 *Yersinia pestis* EC-ddIB D-ALANINE--D-ALANINE LIGASE B (EC 6_3_2_4)
 6_3_2_4 7078 *Vibrio cholerae* El Tor N16961ORFA00230 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 561 *Treponema pallidum* TP0670 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 457 *Streptococcus pyogenes* ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 122 *Streptococcus pneumoniae* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 154 *Streptococcus mutans* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1509 *Streptococcus equi* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 357 *Salmonella typhimurium* ddIA D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 6275 *Salmonella typhimurium* ddl D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 741 *Salmonella typhi* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 3369 *Salmonella typhi* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 2736 *Salmonella paratyphi* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 4793 *Salmonella paratyphi* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 4794 *Salmonella paratyphi* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 1911 *Salmonella enteritidis* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 871 *Salmonella dublin* D-ALANINE--D-ALANINE LIGASE B (EC 6_3_2_4)
 6_3_2_4 3772 *Salmonella dublin* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 243 *Rickettsia prowazekii* RP249 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 628 *Pseudomonas aeruginosa* ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1748 *Pseudomonas aeruginosa* ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1116 *Porphyromonas gingivalis* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 578 *Pasteurella multocida* ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1604 *Neisseria gonorrhoeae* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 829 *Mycobacterium tuberculosis* ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 2271 *Mycobacterium leprae* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1535 *Mycobacterium bovis* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 3228 *Klebsiella pneumoniae* D-ALANINE--D-ALANINE LIGASE B (EC 6_3_2_4)
 6_3_2_4 3229 *Klebsiella pneumoniae* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 7173 *Klebsiella pneumoniae* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 7174 *Klebsiella pneumoniae* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 7175 *Klebsiella pneumoniae* D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 165 *Helicobacter pylori* HP0738 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 675 *Helicobacter pylori* J99spQ9ZLA5 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 5993 *Haemophilus influenzae* HI1140 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 243 *Haemophilus ducreyi* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 92 *Escherichia coli* ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 4452 *Escherichia coli* ddIA D-ALANINE--D-ALANINE LIGASE A (EC 6_3_2_4)
 6_3_2_4 2455 *Enterococcus faecium* (DOE) D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 83 *Enterococcus faecalis* EC-ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1928 *Corynebacterium diphtheriae* D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 3187 *Clostridium difficile* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 2043 *Clostridium acetobutylicum* 4114717_C2_32 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 731 *Chlamydia trachomatis* D/UW-3/CxmurC/ddIA UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 961 *Chlamydia pneumoniae* AR39 CP0961 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 837 *Chlamydia pneumoniae* CWL029murC/ddIA UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 446 *Campylobacter jejuni* ddIA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)

6_3_2_4 541 *Borrelia burgdorferi* BB0200 D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 1250 *Bordetella pertussis* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 9008 *Bordetella bronchiseptica* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_4 456 *Bacillus subtilis* ddiA D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_5 6572 *Yersinia pseudotuberculosis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 546 *Yersinia pestis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 4097 *Vibrio cholerae* El Tor N16961 ORF00307 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 1049 *Staphylococcus aureus* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 6016 *Salmonella typhimurium* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 511 *Salmonella typhi* PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 8 *Pseudomonas aeruginosa* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 651 *Porphyromonas gingivalis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 1846 *Pasteurella multocida* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 1026 *Neisseria gonorrhoeae* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 438 *Mycobacterium tuberculosis* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 3501 *Mycobacterium leprae* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 2319 *Mycobacterium bovis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 263 *Helicobacter pylori* HP0841 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 778 *Helicobacter pylori* J99 dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 2027 *Haemophilus influenzae* H10953 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 1180 *Haemophilus ducreyi* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 3559 *Escherichia coli* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 325 *Corynebacterium diphtheriae* PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 147 *Clostridium difficile* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 2957 *Clostridium acetobutylicum* 26601507_C3_23 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 401 *Campylobacter jejuni* dfp PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 363 *Borrelia burgdorferi* BB0812 PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_5 1570 *Bacillus subtilis* yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTHENOYL CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_8 7936 *Yersinia pseudotuberculosis* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3194 *Yersinia pestis* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4778 *Yersinia pestis* EC-yjIG UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 6167 *Vibrio cholerae* El Tor N16961 ORF03037 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 881 *Treponema pallidum* TP0341 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1252 *Streptococcus pyogenes* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1269 *Streptococcus pneumoniae* BS-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)

6_3_2_8 1610 *Streptococcus mutans* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 230 *Streptococcus equi* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 27 *Staphylococcus aureus* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 6274 *Salmonella typhimurium* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 979 *Salmonella typhi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2479 *Salmonella typhi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2737 *Salmonella paratyphi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2738 *Salmonella paratyphi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4232 *Salmonella paratyphi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4233 *Salmonella paratyphi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4234 *Salmonella paratyphi* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3170 *Salmonella enteritidis* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 960 *Salmonella dublin* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 241 *Rickettsia prowazekii* RP247 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 627 *Pseudomonas aeruginosa* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 5121 *Pseudomonas aeruginosa* mpl UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 115 *Porphyromonas gingivalis* BS-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 579 *Pasteurella multocida* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1735 *Pasteurella multocida* EC-yjFG UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 629 *Neisseria gonorrhoeae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1602 *Neisseria gonorrhoeae* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2419 *Mycobacterium tuberculosis* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1634 *Mycobacterium leprae* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3230 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3231 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3232 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3233 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4020 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 57 *Helicobacter pylori* HP0623 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 568 *Helicobacter pylori* J99spJQ9ZLL2 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 9675 *Haemophilus influenzae* HI139 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 14382 *Haemophilus influenzae* HI0121 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 244 *Haemophilus ducreyi* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1542 *Haemophilus ducreyi* EC-yjFG UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 91 *Escherichia coli* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 4116 *Escherichia coli* yjFG UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1554 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2144 *Enterococcus faecalis* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2943 *Enterococcus faecalis* BS-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 587 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1190 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 3172 *Clostridium difficile* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 142 *Clostridium acetobutylicum* 10968752_F3_76 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 731 *Chlamydia trachomatis* D/UW-3/CxmurC/ddIA UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_8 961 *Chlamydia pneumoniae* AR39 CP0961 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_8 837 *Chlamydia pneumoniae* CWL029murC/ddIA UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8) / D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_8 1697 *Campylobacter jejuni* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 317 *Borrelia burgdorferi* BB0817 UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1251 *Bordetella pertussis* BS-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)

6_3_2_8 1842 *Bordetella pertussis* UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 1843 *Bordetella pertussis* EC-yjG UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 7453 *Bordetella bronchiseptica* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_8 2973 *Bacillus subtilis* murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE (EC 6_3_2_8)
 6_3_2_9 7939 *Yersinia pseudotuberculosis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1166 *Yersinia pestis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 6170 *Vibrio cholerae* El Tor N16961 ORF03040 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 641 *Treponema pallidum* TP0859 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 679 *Treponema pallidum* TP0903 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1450 *Streptococcus pyogenes* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1260 *Streptococcus pneumoniae* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 686 *Streptococcus mutans* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 622 *Streptococcus equi* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 2449 *Staphylococcus aureus* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 3648 *Staphylococcus aureus* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 2371 *Salmonella typhimurium* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 2476 *Salmonella typhi* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 3900 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 3901 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 7285 *Salmonella paratyphi* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 4342 *Salmonella dublin* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 401 *Rickettsia prowazekii* RP410 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 4754 *Pseudomonas aeruginosa* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1147 *Porphyromonas gingivalis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 582 *Pasteurella multocida* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1599 *Neisseria gonorrhoeae* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 5156 *Mycobacterium tuberculosis* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1631 *Mycobacterium leprae* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1789 *Mycobacterium bovis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1011 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1012 *Klebsiella pneumoniae* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 1416 *Helicobacter pylori* HP0494 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC 6_3_2_9)

6_3_2_9 451 *Helicobacter pylori* J99tr|Q9ZLY0 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 5988 *Haemophilus influenzae* HII 136 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 1419 *Haemophilus ducreyi* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 88 *Escherichia coli* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC
 6_3_2_9)
 6_3_2_9 3458 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 3465 *Enterococcus faecium* (DOE) UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 1936 *Enterococcus faecalis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 590 *Corynebacterium diphtheriae* UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 1161 *Clostridium difficile* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 270 *Clostridium acetobutylicum* 4720392_F2_6 UDP-N-ACETYLMURAMOYLALANINE--D-
 GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 727 *Chlamydia trachomatis* D/UW-3/Cx EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-
 GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 965 *Chlamydia pneumoniae* AR39 CP0965 UDP-N-ACETYLMURAMOYLALANINE--D-
 GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 833 *Chlamydia pneumoniae* CWL029 EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-
 GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_2_9 210 *Campylobacter jejuni* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE
 (EC 6_3_2_9)
 6_3_2_9 171 *Borrelia burgdorferi* BB0585 UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 1254 *Bordetella pertussis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 7456 *Bordetella bronchiseptica* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE
 LIGASE (EC 6_3_2_9)
 6_3_2_9 1521 *Bacillus subtilis* murD UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE (EC
 6_3_2_9)
 6_3_3_3 4728 *Yersinia pseudotuberculosis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 5067 *Yersinia pseudotuberculosis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 7846 *Yersinia pseudotuberculosis* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 2241 *Yersinia pestis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3846 *Yersinia pestis* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 4941 *Vibrio cholerae* El Tor N16961 ORF01458 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 2636 *Staphylococcus aureus* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1775 *Salmonella typhimurium* bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3119 *Salmonella typhimurium* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1020 *Salmonella typhi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 4851 *Salmonella typhi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 2096 *Salmonella paratyphi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 2098 *Salmonella paratyphi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 4046 *Salmonella paratyphi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 457 *Salmonella enteritidis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3549 *Salmonella enteritidis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3781 *Salmonella dublin* PUTATIVE DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 7637 *Saccharomyces cerevisiae* BIO4 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 4678 *Pseudomonas aeruginosa* bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1240 *Porphyromonas gingivalis* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1178 *Pasteurella multocida* bioD2 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1577 *Pasteurella multocida* bioD1 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 759 *Neisseria gonorrhoeae* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 2618 *Mycobacterium tuberculosis* bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1578 *Mycobacterium leprae*sp|P45486 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 1933 *Klebsiella pneumoniae* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)

6_3_3_3 1934 *Klebsiella pneumoniae* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 7618 *Klebsiella pneumoniae* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 991 *Helicobacter pylori* HP0029 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 24 *Helicobacter pylori* J99 bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 11517 *Haemophilus influenzae* H11445 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 18630 *Haemophilus influenzae* H11550 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 554 *Haemophilus ducreyi* EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 951 *Haemophilus ducreyi* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 745 *Escherichia coli* bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 5000 *Escherichia coli* b1593 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 822 *Corynebacterium diphtheriae* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3487 *Clostridium acetobutylicum* 19657691 CI_7 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 810 *Chlamydia pneumoniae* AR39 CP0810 DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 964 *Chlamydia pneumoniae* CWL029 EC-bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_3_3 3015 *Bacillus subtilis* bioD DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_4_6 4285 *Yersinia pseudotuberculosis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 2282 *Yersinia pestis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 7283 *Vibrio cholerae* El Tor N16961ORFA00493 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 7284 *Vibrio cholerae* El Tor N16961ORFA00494 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 922 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 923 *Staphylococcus aureus* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 1360 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 1361 *Staphylococcus aureus* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 5051 *Salmonella typhimurium* ybgK UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 5052 *Salmonella typhimurium* ybgJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 3339 *Salmonella typhi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 4842 *Salmonella typhi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 3245 *Salmonella paratyphi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 3246 *Salmonella paratyphi* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 3905 *Salmonella dublin* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 6608 *Saccharomyces cerevisiae* DUR1,2 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 2353 *Pseudomonas aeruginosa* PA4510 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 2354 *Pseudomonas aeruginosa* PA4509 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 4869 *Pseudomonas aeruginosa* PA2110 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 5257 *Pseudomonas aeruginosa* PA0495 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54) / BIOTIN CARBOXYLASE (EC 6_3_4_14)
 6_3_4_6 5258 *Pseudomonas aeruginosa* PA0496 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 8451 *Pseudomonas aeruginosa* PA2111 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 6_3_4_6 2743 *Mycobacterium tuberculosis* Rv0263c UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)

6_3_4_6 2744 *Mycobacterium tuberculosis* Rv0264c UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 421 *Mycobacterium leprae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 422 *Mycobacterium leprae* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 3460 *Mycobacterium bovis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 3461 *Mycobacterium bovis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 1735 *Klebsiella pneumoniae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 1737 *Klebsiella pneumoniae* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 14660 *Haemophilus influenzae* HII730 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 18274 *Haemophilus influenzae* HII731 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 685 *Escherichia coli* b0711 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 686 *Escherichia coli* b0712 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 271 *Clostridium difficile* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 272 *Clostridium difficile* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 2019 *Campylobacter jejuni* Cj1542 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 2021 *Campylobacter jejuni* Cj1543 UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 4415 *Bordetella pertussis* UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
6_3_4_6 7189 *Bordetella bronchiseptica* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)

Figure 7B

I_1_1_103 7706 *Yersinia pseudotuberculosis* THREONINE 3-DEHYDROGENASE (EC I_1_1_103)
 I_1_1_117 5819 *Saccharomyces cerevisiae* ARA1 D-ARABINOSE DEHYDROGENASE [NAD(P)+]
 HEAVY CHAIN (EC I_1_1_117)
 I_1_1_122 1990 *Staphylococcus aureus* BS-yqkF D-threo-aldose 1-dehydrogenase (EC I_1_1_122)
 I_1_1_125 5491 *Yersinia pseudotuberculosis* EC-kduD 2-DEOXY-D-GLUCONATE 3-DEHYDROGENASE
 (EC I_1_1_125)
 I_1_1_128 2873 *Salmonella typhimurium* idnD L-idonate 2-dehydrogenase (EC I_1_1_128)
 I_1_1_132 1698 *Pseudomonas aeruginosa* algD GDP-MANNOSE 6-DEHYDROGENASE (EC I_1_1_132)
 I_1_1_133 576 *Streptococcus pyogenes* rmlD DTD-4-DEHYDRORHAMNOSE REDUCTASE (EC
 I_1_1_133)
 I_1_1_140 689 *Streptococcus mutans* Q9X671 SORBITOL-6-PHOSPHATE 2-DEHYDROGENASE (EC
 I_1_1_140)
 I_1_1_154 5678 *Salmonella typhimurium* UREIDOGLYCOLATE DEHYDROGENASE (EC I_1_1_154)
 I_1_1_157 2474 *Pseudomonas aeruginosa* PA1628 3-HYDROXYBUTYRYL-COA DEHYDROGENASE (EC
 I_1_1_157)
 I_1_1_158 6211 *Yersinia pseudotuberculosis* EC-murB UDP-N-ACETYLENOLPYRUVOYLGLUCOSAMINE
 REDUCTASE (EC I_1_1_158)
 I_1_1_159 3149 *Mycobacterium tuberculosis* Rv3485c 7-ALPHA-HYDROXYSTEROID DEHYDROGENASE
 (EC I_1_1_159)
 I_1_1_169 3121 *Yersinia pestis* EC-apbA 2-DEHYDROPANTOATE 2-REDUCTASE (EC I_1_1_169)
 I_1_1_17 2665 *Yersinia pestis* EC-mtlD MANNITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC I_1_1_17)
 I_1_1_179 6589 *Yersinia pseudotuberculosis* EC-ygiR TRANS-1,2-DIHYDROBENZENE-1,2-DIOL
 DEHYDROGENASE (EC I_3_1_20) / D-xylose 1-dehydrogenase (NADP+) (EC I_1_1_179)
 I_1_1_18 6536 *Yersinia pseudotuberculosis* BS-yvaA MYO-INOSITOL 2-DEHYDROGENASE (EC
 I_1_1_18)
 I_1_1_193 4162 *Yersinia pseudotuberculosis* EC-ribD
 DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-
 (5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC I_1_1_193)
 I_1_1_195 3347 *Saccharomyces cerevisiae* YCR105W CINNAMYL-ALCOHOL DEHYDROGENASE (EC
 I_1_1_195)
 I_1_1_202 721 *Streptococcus pneumoniae* 1,3-PROPANEDIOL DEHYDROGENASE (EC I_1_1_202)
 I_1_1_215 7594 *Yersinia pseudotuberculosis* EC-yiaE gluconate 2-dehydrogenase (EC I_1_1_215)
 I_1_1_218 1521 *Staphylococcus aureus* MORPHINE 6-DEHYDROGENASE (EC I_1_1_218)
 I_1_1_23 7518 *Yersinia pseudotuberculosis* EC-hisD HISTIDINOL DEHYDROGENASE (EC I_1_1_23)
 I_1_1_233 5523 *Yersinia pseudotuberculosis* N-ACYLMANNOSAMINE 1-DEHYDROGENASE (EC
 I_1_1_233)
 I_1_1_236 4453 *Bordetella pertussis* TROPINONE REDUCTASE-II (EC I_1_1_236)
 I_1_1_24 246 *Neurospora crassa* qa-3 QUINATE 5-DEHYDROGENASE (EC I_1_1_24)
 I_1_1_244 1536 *Streptococcus pneumoniae* NAD-DEPENDENT METHANOL DEHYDROGENASE
 (EC I_1_1_244)
 I_1_1_245 4533 *Mycobacterium tuberculosis* Rv0851c cyclohexanol dehydrogenase (EC I_1_1_245)
 I_1_1_25 5471 *Yersinia pseudotuberculosis* EC-aroE SHIKIMATE 5-DEHYDROGENASE (EC I_1_1_25)
 I_1_1_250 6682 *Yersinia pseudotuberculosis* D-ARABINITOL 2-DEHYDROGENASE (RIBULOSE
 FORMING) (EC I_1_1_250)
 I_1_1_251 3106 *Salmonella typhi* GALACTITOL-1-PHOSPHATE 5-DEHYDROGENASE (EC
 I_1_1_251)
 I_1_1_28 6363 *Yersinia pseudotuberculosis* EC-ldhA D-LACTATE DEHYDROGENASE (EC I_1_1_28)
 I_1_1_29 6261 *Vibrio cholerae* El Tor N16961 ORF03166 GLYCERATE DEHYDROGENASE (EC I_1_1_29)
 I_1_1_3 6039 *Yersinia pseudotuberculosis* EC-metL ASPARTOKINASE II (EC 2_7_2_4) / HOMOSERINE
 DEHYDROGENASE II (EC I_1_1_3)
 I_1_1_31 7573 *Yersinia pseudotuberculosis* EC-yhaE 3-HYDROXYISOBUTYRATE DEHYDROGENASE
 PRECURSOR (EC I_1_1_31)
 I_1_1_36 7197 *Vibrio cholerae* El Tor N16961 ORFA00378 ACETOACETYL-COA REDUCTASE (EC
 I_1_1_36)
 I_1_1_38 4354 *Yersinia pestis* PUTATIVE MALATE OXIDOREDUCTASE (EC I_1_1_38)
 I_1_1_4 6406 *Yersinia pseudotuberculosis* 2,3-BUTANEDIOL DEHYDROGENASE (EC I_1_1_4)
 I_1_1_5 1649 *Streptococcus pyogenes* ACETOIN(DIACETYL) REDUCTASE (EC I_1_1_5)
 I_1_1_56 3415 *Klebsiella pneumoniae* RIBITOL 2-DEHYDROGENASE (EC I_1_1_56)
 I_1_1_57 6851 *Yersinia pseudotuberculosis* EC-yeiQ D-MANNONATE OXIDOREDUCTASE (EC I_1_1_57)

I_1_1_58 7696 *Yersinia pseudotuberculosis* EC-uxaB ALTRONATE OXIDOREDUCTASE (EC I_1_1_58)
 I_1_1_6 6412 *Yersinia pseudotuberculosis* EC-gldA GLYCEROL DEHYDROGENASE (EC I_1_1_6)
 I_1_1_60 4592 *Salmonella typhimurium* yhaE 2-HYDROXY-3-OXOPROPIONATE REDUCTASE (EC I_1_1_60)
 I_1_1_61 6596 *Yersinia pseudotuberculosis* 4-hydroxybutyrate dehydrogenase (EC I_1_1_61)
 I_1_1_67 6339 *Saccharomyces cerevisiae* YEL070W MANNITOL 2-DEHYDROGENASE (EC I_1_1_67)
 I_1_1_69 6602 *Yersinia pseudotuberculosis* EC-yjgU GLUCONATE 5-DEHYDROGENASE (EC I_1_1_69)
 I_1_1_77 7794 *Yersinia pseudotuberculosis* LACTALDEHYDE REDUCTASE (EC I_1_1_77)
 I_1_1_81 6706 *Yersinia pseudotuberculosis* hydroxypyruvate reductase (EC I_1_1_81)
 I_1_1_82 2225 *Salmonella typhimurium* yiaK MALATE DEHYDROGENASE (EC I_1_1_37) (EC I_1_1_82)
 I_1_1_85 5094 *Yersinia pseudotuberculosis* 3-ISOPROPYLMALATE DEHYDROGENASE (EC I_1_1_85)
 I_1_1_86 5524 *Yersinia pseudotuberculosis* EC-ilvC KETOL-ACID REDUCTOISOMERASE (EC I_1_1_86)
 I_1_1_88 1236 *Streptococcus pyogenes* mvaS_1 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (EC I_1_1_88)
 I_1_1_9 7941 *Saccharomyces cerevisiae* YLR070C D-XYLULOSE REDUCTASE (EC I_1_1_9)
 I_1_1_90 8244 *Klebsiella pneumoniae* ARYL-ALCOHOL DEHYDROGENASE (EC I_1_1_90)
 I_1_1_91 5043 *Salmonella paratyphi* ARYL-ALCOHOL DEHYDROGENASE (NADP+) (EC I_1_1_91)
 I_1_1_93 6131 *Yersinia pseudotuberculosis* BS-ycsA PROBABLE TARTRATE DEHYDROGENASE (EC I_1_1_93)
 I_1_1_94 271 *Yersinia pestis* EC-gpsA GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD(P)+) (EC I_1_1_94)
 I_1_2_3 5868 *Yersinia pseudotuberculosis* EC-ldtD L-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_3)
 I_1_2_4 7485 *Vibrio cholerae* El Tor N16961ORFA00737 D-LACTATE DEHYDROGENASE (CYTOCHROME) (EC I_1_2_4)
 I_1_3_24 5908 *Saccharomyces cerevisiae* ALO1 L-GALACTONOLACTONE OXIDASE (EC I_1_3_24) / D-ARABINONO-1,4-LACTONE OXIDASE (EC I_1_3_37)
 I_1_3_37 5908 *Saccharomyces cerevisiae* ALO1 L-GALACTONOLACTONE OXIDASE (EC I_1_3_24) / D-ARABINONO-1,4-LACTONE OXIDASE (EC I_1_3_37)
 I_1_3_6 1934 *Mycobacterium tuberculosis* choD CHOLESTEROL OXIDASE PRECURSOR (EC I_1_3_6)
 I_1_3_8 3056 *Mycobacterium tuberculosis* Rv3790 L-GULONOLACTONE OXIDASE (EC I_1_3_8)
 I_1_3_9 4256 *Clostridium acetobutylicum* GALACTOSE OXIDASE PRECURSOR (EC I_1_3_9)
 I_1_99_10 20148 *Neurospora crassa* GLUCOSE DEHYDROGENASE (ACCEPTOR) PRECURSOR (EC I_1_99_10)
 I_1_99_16 1142 *Staphylococcus aureus* MALATE:QUINONE OXIDOREDUCTASE (EC I_1_99_16)
 I_1_99_17 3487 *Salmonella typhimurium* yliI GLUCOSE DEHYDROGENASE-B (PYRROLOQUINOLINE-QUINONE) PRECURSOR (EC I_1_99_17)
 I_1_99_21 8182 *Pseudomonas aeruginosa* PA4571 sorbitol dehydrogenase, cytochrome c subunit (EC I_1_99_21)
 I_1_99_25 6023 *Yersinia pseudotuberculosis* BS-yhfK quinate dehydrogenase (pyrroloquinoline-quinone) (EC I_1_99_25)
 I_1_99_28 3781 *Yersinia pestis* GLUCOSE--FRUCTOSE OXIDOREDUCTASE PRECURSOR (EC I_1_99_28)
 I_1_99_3 2248 *Pseudomonas aeruginosa* PA2266 gluconate 2-dehydrogenase, cytochrome c subunit (EC I_1_99_3)
 I_1_99_8 5086 *Pseudomonas aeruginosa* exaA ALCOHOL DEHYDROGENASE [ACCEPTOR] PRECURSOR (EC I_1_99_8)
 I_10_3_2 5230 *Yersinia pseudotuberculosis* EC-yacK LACCASE I PRECURSOR (EC I_10_3_2)
 I_10_99_1 264 *Rickettsia prowazekii* RP270 CYTOCHROME B6-F COMPLEX IRON-SULFUR SUBUNIT (EC I_10_99_1)
 I_11_1_1 1506 *Streptococcus pyogenes* NADH PEROXIDASE (EC I_11_1_1)
 I_11_1_10 5676 *Salmonella typhimurium* NON-HEME CHLOROPEROXIDASE (EC I_11_1_10)
 I_11_1_5 5289 *Yersinia pseudotuberculosis* EC-yhjA CYTOCHROME C551 PEROXIDASE PRECURSOR (EC I_11_1_5)
 I_12_1_2 12 *Clostridium difficile* NAD-REDUCING HYDROGENASE HOXS ALPHA SUBUNIT (EC I_12_1_2)
 I_12_99_1 1065 *Clostridium difficile* COENZYME F420 HYDROGENASE BETA SUBUNIT (EC I_12_99_1)
 I_12_99_3 65 *Helicobacter pylori* HP0631 QUINONE-REACTIVE NI/FE-HYDROGENASE SMALL CHAIN PRECURSOR (EC I_12_99_3)

1_13_11_1 257 *Pseudomonas aeruginosa* catA CATECHOL 1,2-DIOXYGENASE (EC 1_13_11_1)
 1_13_11_2 5927 *Pseudomonas aeruginosa* PA3503 METAPYROCATECHASE (EC 1_13_11_2)
 1_13_11_3 387 *Rickettsia prowazekii* RP396 PROTOCATECHUATE 3,4-DIOXYGENASE BETA CHAIN
 (EC 1_13_11_3)
 1_13_11_4 3418 *Salmonella typhimurium* GENTISATE 1,2-DIOXYGENASE (EC 1_13_11_4)
 1_13_11_8 1438 *Klebsiella pneumoniae* PROTOCATECHUATE 4,5-DIOXYGENASE BETA CHAIN
 (EC 1_13_11_8)
 1_14_12_1 2526 *Pseudomonas aeruginosa* antA ANTHRANILATE DIOXYGENASE LARGE SUBUNIT
 (EC 1_14_12_1)
 1_14_12_3 3775 *Mycobacterium tuberculosis* Rv3161c BENZENE 1,2-DIOXYGENASE ALPHA SUBUNIT
 (EC 1_14_12_3)
 1_14_13_1 3165 *Staphylococcus aureus* SALICYLATE HYDROXYLASE (EC 1_14_13_1)
 1_14_13_2 1552 *Pseudomonas aeruginosa* pobA P-HYDROXYBENZOATE HYDROXYLASE (EC
 1_14_13_2)
 1_14_13_3 4819 *Yersinia pseudotuberculosis* 4-HYDROXYPHENYLACETATE 3-MONOOXYGENASE
 (EC 1_14_13_3)
 1_14_13_7 3305 *Clostridium difficile* PHENOL HYDROXYLASE P5 PROTEIN (EC 1_14_13_7)
 1_14_14_3 7523 *Yersinia pseudotuberculosis* EC-yhbW ALKANAL MONOOXYGENASE ALPHA CHAIN
 (EC 1_14_14_3)
 1_14_99_6 2999 *Mycobacterium tuberculosis* desA1 ACYL-[ACYL-CARRIER PROTEIN] DESATURASE
 PRECURSOR (EC 1_14_99_6)
 1_16_1_1 480 *Streptococcus pneumoniae* EC-ykgC MERCURIC REDUCTASE (EC 1_16_1_1)
 1_2_1_10 5050 *Yersinia pestis* EC-yiaY ALCOHOL DEHYDROGENASE (EC 1_1_1_1)/ACETALDEHYDE
 DEHYDROGENASE (ACETYLATED) (EC 1_2_1_10)/PYRUVATE-FORMATE-LYASE DEACTIVASE
 1_2_1_11 4156 *Yersinia pseudotuberculosis* ASPARTATE-SEMIALDEHYDE DEHYDROGENASE (EC
 1_2_1_11)
 1_2_1_2 6935 *Yersinia pseudotuberculosis* EC-fdhF FORMATE DEHYDROGENASE ALPHA CHAIN (EC
 1_2_1_2)
 1_2_1_22 5616 *Vibrio cholerae* El Tor N16961 ORF02302 ALDEHYDE DEHYDROGENASE B (EC
 1_2_1_22)
 1_2_1_38 7307 *Yersinia pseudotuberculosis* EC-argC N-ACETYL-GAMMA-GLUTAMYL-PHOSPHATE
 REDUCTASE (EC 1_2_1_38)
 1_2_1_39 8343 *Pseudomonas aeruginosa* PA4073 PHENYLACETALDEHYDE DEHYDROGENASE (EC
 1_2_1_39)
 1_2_1_46 8076 *Pseudomonas aeruginosa* fdhA GLUTATHIONE-INDEPENDENT FORMALDEHYDE
 DEHYDROGENASE (EC 1_2_1_46)
 1_2_1_9 502 *Ureaplasma urealyticum* UU362 NADP-DEPENDENT GLYCERALDEHYDE-3-PHOSPHATE
 DEHYDROGENASE (EC 1_2_1_9)
 1_2_2_2 6213 *Yersinia pseudotuberculosis* EC-poxB PYRUVATE DEHYDROGENASE (CYTOCHROME)
 (EC 1_2_2_2)
 1_2_2_4 3880 *Mycobacterium tuberculosis* Rv0375c CARBON MONOXIDE OXYGENASE [CYTOCHROME
 B-561], MEDIUM CHAIN (EC 1_2_2_4)
 1_2_3_3 904 *Streptococcus pneumoniae* EC-poxB PYRUVATE OXIDASE (EC 1_2_3_3)
 1_2_7_1 1920 *Staphylococcus aureus* PYRUVATE SYNTHASE SUBUNIT PORB (EC 1_2_7_1)
 1_2_99_2 3882 *Mycobacterium tuberculosis* Rv0373c CARBON MONOXIDE DEHYDROGENASE ALPHA
 SUBUNIT (EC 1_2_99_2)
 1_2_99_3 2737 *Pseudomonas aeruginosa* PA1880 MEMBRANE-BOUND ALDEHYDE DEHYDROGENASE
 (PYRROLOQUINOLINE-QUINONE) (EC 1_2_99_3)
 1_3_1_10 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES:
 EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 1_3_1_12 6916 *Yersinia pseudotuberculosis* EC-tyrA CHORISMATE MUTASE (EC 5_4_99_5)/
 PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_26 5250 *Yersinia pseudotuberculosis* EC-dapB DIHYDRODIPICOLINATE REDUCTASE (EC
 1_3_1_26)
 1_3_1_28 5065 *Yersinia pseudotuberculosis* 2,3-DIHYDRO-2,3-DIHYDROXYBENZOATE
 DEHYDROGENASE (EC 1_3_1_28)
 1_3_1_31 211 *Clostridium acetobutylicum* 4803135_F3_74 2-ENOATE REDUCTASE (EC 1_3_1_31)
 1_3_1_33 2343 *Mycobacterium tuberculosis* Rv0303 PROTOCHLOROPHYLLIDE REDUCTASE
 PRECURSOR (EC 1_3_1_33)
 1_3_1_43 388 *Streptococcus pneumoniae* EC-tyrA AROGENATE DEHYDROGENASE (EC 1_3_1_43)/
 PREPHENATE DEHYDROGENASE (EC 1_3_1_12)
 1_3_1_54 976 *Salmonella typhimurium* spjQ05591 PRECORRIN-6X REDUCTASE (EC 1_3_1_54)

1_3_1_55 4285 *Pseudomonas aeruginosa* xylL CIS-1,2-DIHYDROXYCYCLOHEXA-3,5-DIENE-1-CARBOXYLATE DEHYDROGENASE (EC 1_3_1_55)
 1_3_1_6 450 *Streptococcus mutans* fumarate reductase (NADH) (EC 1_3_1_6)
 1_3_1_9 73 *Streptococcus pyogenes* fabK ENOYL-[ACYL-CARRIER PROTEIN] REDUCTASE (NADH) (EC 1_3_1_9)
 1_3_99_16 827 *Pseudomonas aeruginosa* PA1602 ISOQUINOLINE 1-OXIDOREDUCTASE ALPHA SUBUNIT (EC 1_3_99_16)
 1_3_99_4 6227 *Pseudomonas aeruginosa* PA2243 3-OXOSTEROID 1-DEHYDROGENASE (EC 1_3_99_4)
 1_4_1_1 5701 *Vibrio cholerae* El Tor N16961 ORF02403 ALANINE DEHYDROGENASE (EC 1_4_1_1)
 1_4_1_13 7734 *Yersinia pseudotuberculosis* EC-gltB GLUTAMATE SYNTHASE [NADPH] LARGE CHAIN (EC 1_4_1_13)
 1_4_1_16 523 *Porphyromonas gingivalis* MESO-DIAMINOPIMELATE D-DEHYDROGENASE (EC 1_4_1_16)
 1_4_1_2 5304 *Vibrio cholerae* El Tor N16961 ORF01910 NAD-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_2)
 1_4_1_4 2029 *Yersinia pestis* EC-gdhA NADP-SPECIFIC GLUTAMATE DEHYDROGENASE (EC 1_4_1_4)
 1_4_1_9 5327 *Pseudomonas aeruginosa* ldh LEUCINE DEHYDROGENASE (EC 1_4_1_9)
 1_4_3_16 6756 *Yersinia pseudotuberculosis* EC-nadB L-ASPARTATE OXIDASE (EC 1_4_3_16)
 1_4_3_2 1900 *Bacillus subtilis* yobN L-AMINO ACID OXIDASE (EC 1_4_3_2)
 1_4_7_1 6140 *Vibrio cholerae* El Tor N16961 ORF03003 FERREDOXIN-DEPENDENT GLUTAMATE SYNTHASE I (EC 1_4_7_1)
 1_4_99_1 5331 *Yersinia pseudotuberculosis* EC-dadA D-AMINO ACID DEHYDROGENASE SMALL SUBUNIT (EC 1_4_99_1)
 1_5_1_19 57 *Pseudomonas aeruginosa* hcnB D-nopaline dehydrogenase (EC 1_5_1_19)
 1_5_1_28 1247 *Staphylococcus aureus* OPINE DEHYDROGENASE (EC 1_5_1_28)
 1_5_1_7 284 *Saccharomyces cerevisiae* LYSI SACCHAROPINE DEHYDROGENASE (NAD⁺, L-LYSINE FORMING) (EC 1_5_1_7)
 1_5_3_1 216 *Yersinia pestis* SARCOSINE OXIDASE (EC 1_5_3_1)
 1_5_3_6 1593 *Yersinia pestis* 6-HYDROXY-D-NICOTINE OXIDASE (EC 1_5_3_6)
 1_5_99_2 2270 *Pseudomonas aeruginosa* PA5309 DIMETHYLGLYCINE DEHYDROGENASE (EC 1_5_99_2)
 1_5_99_4 20548 *Neurospora crassa* NICOTINE DEHYDROGENASE (EC 1_5_99_4)
 1_5_99_8 7719 *Yersinia pseudotuberculosis* EC-putA PROLINE DEHYDROGENASE (EC 1_5_99_8) / DELTA-1- PYRROLINE-5-CARBOXYLATE DEHYDROGENASE (EC 1_5_1_12)
 1_5_99_9 825 *Mycobacterium tuberculosis* Rv2951c F420-DEPENDENT METHYLENETETRAHYDROMETHANOPTERIN DEHYDROGENASE (EC 1_5_99_9)
 1_6_1_1 2656 *Salmonella enteritidis* SOLUBLE PYRIDINE NUCLEOTIDE TRANSHYDROGENASE (EC 1_6_1_1)
 1_6_6_1 2837 *Salmonella typhimurium* NITRATE REDUCTASE (EC 1_6_6_1)
 1_6_6_3 7493 *Yersinia pseudotuberculosis* NITRATE REDUCTASE (NADPH) (EC 1_6_6_3)
 1_6_6_4 7870 *Yersinia pseudotuberculosis* EC-nirD NITRITE REDUCTASE (NAD(P)H) SMALL SUBUNIT (EC 1_6_6_4)
 1_6_6_9 5490 *Vibrio cholerae* El Tor N16961 ORF02162 TRIMETHYLAMINE-N-OXIDE REDUCTASE PRECURSOR (EC 1_6_6_9)
 1_6_8_1 5170 *Yersinia pestis* NADH-DEPENDENT FMN REDUCTASE (EC 1_6_8_1)
 1_7_7_1 590 *Mycobacterium tuberculosis* nirA FERREDOXIN--NITRITE REDUCTASE (EC 1_7_7_1)
 1_7_99_4 7910 *Yersinia pseudotuberculosis* EC-napA PERIPLASMIC NITRATE REDUCTASE PRECURSOR (EC 1_7_99_4)
 1_7_99_5 6038 *Yersinia pseudotuberculosis* EC-metF 5,10-METHYLENETETRAHYDROFOLATE REDUCTASE (EC 1_7_99_5)
 1_7_99_6 356 *Pseudomonas aeruginosa* nosZ NITROUS-OXIDE REDUCTASE (EC 1_7_99_6)
 1_7_99_7 1406 *Pseudomonas aeruginosa* norB NITRIC-OXIDE REDUCTASE SUBUNIT B (EC 1_7_99_7)
 1_8_1_2 4928 *Yersinia pseudotuberculosis* SULFITE REDUCTASE (NADPH) FLAVOPROTEIN ALPHA-COMPONENT (EC 1_8_1_2)
 1_8_7_1 6122 *Saccharomyces cerevisiae* ECM17 SULFITE REDUCTASE (FERREDOXIN) (EC 1_8_7_1)
 1_8_99_2 5628 *Pseudomonas aeruginosa* PA2298 ADENYLYL-SULPHATE REDUCTASE ALFA-SUBUNIT (EC 1_8_99_2)
 1_8_99_3 3722 *Yersinia pestis* EC-yccK SULFITE REDUCTASE, DISSIMILATORY-TYPE GAMMA SUBUNIT (EC 1_8_99_3)
 1_9_3_2 1909 *Pseudomonas aeruginosa* nirS NITRITE REDUCTASE PRECURSOR (EC 1_9_3_2)
 2_1_1_10 252 *Escherichia coli* yagD HOMOCYSTEINE S-METHYLTRANSFERASE (EC 2_1_1_10)

2_1_1_100 2200 *Saccharomyces cerevisiae* STE14 PROTEIN-S ISOPRENYLCYSTEINE O-METHYLTRANSFERASE (EC 2_1_1_100)
 2_1_1_104 703 *Streptococcus pyogenes* BS-*yyrM* CAFFEYOYL-COA O-METHYLTRANSFERASE (EC 2_1_1_104)
 2_1_1_107 6879 *Yersinia pseudotuberculosis* EC-hemX PUTATIVE UROPORPHYRIN-III C-METHYLTRANSFERASE (EC 2_1_1_107)
 2_1_1_113 6162 *Yersinia pseudotuberculosis* MODIFICATION METHYLASE CFR9I (EC 2_1_1_113)
 2_1_1_114 1883 *Saccharomyces cerevisiae* COQ3 HEXAPRENYLDIHYDROXYBENZOATE METHYLTRANSFERASE PRECURSOR (EC 2_1_1_114)
 2_1_1_130 978 *Salmonella typhimurium* *cbiL* PRECORRIN-2 C20-METHYLTRANSFERASE (EC 2_1_1_130)
 2_1_1_131 975 *Salmonella typhimurium* *cbiH* PRECORRIN-3B C17-METHYLTRANSFERASE (EC 2_1_1_131)
 2_1_1_132 971 *Salmonella typhimurium* *cbiE* PRECORRIN-6Y C5,15-METHYLTRANSFERASE (DECARBOXYLATING) (EC 2_1_1_132)
 2_1_1_133 973 *Salmonella typhimurium* *cbiF* PRECORRIN-4 C11-METHYLTRANSFERASE (EC 2_1_1_133)
 2_1_1_14 5982 *Yersinia pseudotuberculosis* 5-METHYLTETRAHYDROPTEROYLTRIGLUTAMATE--HOMOCYSTEINE METHYLTRANSFERASE (EC 2_1_1_14)
 2_1_1_16 2534 *Saccharomyces cerevisiae* OPI3 METHYLENE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_16)
 2_1_1_34 7362 *Yersinia pseudotuberculosis* EC-spoU TRNA (GUANOSINE-2'-O-) -METHYLTRANSFERASE (EC 2_1_1_34)
 2_1_1_35 7315 *Yersinia pseudotuberculosis* TRNA (URACIL-5-) -METHYLTRANSFERASE (EC 2_1_1_35)
 2_1_1_41 4901 *Saccharomyces cerevisiae* ERG6 DELTA(24)-STEROL C-METHYLTRANSFERASE (EC 2_1_1_41)
 2_1_1_48 841 *Staphylococcus aureus* RRNA ADENINE N-6-METHYLTRANSFERASE (EC 2_1_1_48)
 2_1_1_51 5798 *Vibrio cholerae* El Tor N16961 ORF02531 RRNA (GUANINE-N1-) -METHYLTRANSFERASE (EC 2_1_1_51)
 2_1_1_52 6485 *Yersinia pseudotuberculosis* EC-*yjtT* RIBOSOMAL RNA SMALL SUBUNIT METHYLTRANSFERASE C (EC 2_1_1_52)
 2_1_1_64 5749 *Yersinia pseudotuberculosis* EC-*ubiG* 3-DEMETHYLUBIQUINONE-9 3-METHYLTRANSFERASE (EC 2_1_1_64)
 2_1_1_72 5839 *Yersinia pseudotuberculosis* DNA ADENINE METHYLASE (EC 2_1_1_72)
 2_1_1_79 4807 *Yersinia pseudotuberculosis* CYCLOPROPANE-FATTY-ACYL-PHOSPHOLIPID SYNTHASE (EC 2_1_1_79)
 2_1_1_98 3344 *Saccharomyces cerevisiae* DPH5 DIPHTHINE SYNTHASE (EC 2_1_1_98)
 2_1_2_11 7188 *Yersinia pseudotuberculosis* EC-*panB* 3-METHYL-2-OXOBUTANOATE HYDROXYMETHYLTRANSFERASE (EC 2_1_2_11)
 2_1_2_9 7323 *Yersinia pseudotuberculosis* METHIONYL-TRNA FORMYLTRANSFERASE (EC 2_1_2_9)
 2_1_3_1 72 *Streptococcus equi* BIOTIN CARBOXYL CARRIER PROTEIN OF METHYLMALONYL-COA CARBOXYL-TRANSFERASE (EC 2_1_3_1)
 2_1_3_5 6612 *Salmonella typhimurium* *glxB6* oxamate carbamoyltransferase (EC 2_1_3_5)
 2_3_1_109 6580 *Yersinia pseudotuberculosis* ARGININE N-SUCCINYLTRANSFERASE, BETA CHAIN (EC 2_3_1_109)
 2_3_1_117 6549 *Yersinia pseudotuberculosis* EC-*dapD* 2,3,4,5-TETRAHYDROPYRIDINE-2-CARBOXYLATE N-SUCCINYLTRANSFERASE (EC 2_3_1_117)
 2_3_1_129 4319 *Yersinia pseudotuberculosis* EC-*lpxA* ACYL-[ACYL-CARRIER-PROTEIN]-UDP-N-ACETYLGLUCOSAMINE O-ACYLTRANSFERASE (EC 2_3_1_129)
 2_3_1_15 7483 *Yersinia pseudotuberculosis* EC-*plsB* GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE (EC 2_3_1_15)
 2_3_1_18 3394 *Staphylococcus aureus* BS-*yyaI* GALACTOSIDE O-ACETYLTRANSFERASE (EC 2_3_1_18)
 2_3_1_19 107 *Rickettsia prowazekii* RP109 PHOSPHATE BUTYRYLTRANSFERASE (EC 2_3_1_19)
 2_3_1_28 6768 *Vibrio cholerae* El Tor N16961 ORFA01206 CHLORAMPHENICOL ACETYLTRANSFERASE (EC 2_3_1_28)
 2_3_1_30 6922 *Yersinia pseudotuberculosis* EC-*cysE* SERINE ACETYLTRANSFERASE (EC 2_3_1_30)
 2_3_1_31 1111 *Staphylococcus aureus* HOMOSERINE O-ACETYLTRANSFERASE (EC 2_3_1_31)
 2_3_1_35 1663 *Streptococcus mutans* BS-*argJ* GLUTAMATE N-ACETYLTRANSFERASE (EC 2_3_1_35) / AMINO-ACID ACETYLTRANSFERASE (EC 2_3_1_1)

2_3_1_38 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3- HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 2_3_1_41 4420 *Yersinia pseudotuberculosis* EC-fabH 3-OXOACYL-[ACYL-CARRIER-PROTEIN] SYNTHASE III (EC 2_3_1_41)
 2_3_1_46 6404 *Yersinia pseudotuberculosis* EC-metA HOMOSERINE O-SUCCINYLTRANSFERASE (EC 2_3_1_46)
 2_3_1_47 7844 *Yersinia pseudotuberculosis* EC-bioF 8-AMINO-7-OXONONANOATE SYNTHASE (EC 2_3_1_47)
 2_3_1_54 6846 *Yersinia pseudotuberculosis* EC-pf1B FORMATE ACETYLTRANSFERASE 1 (EC 2_3_1_54)
 2_3_1_74 699 *Mycobacterium tuberculosis* pks18 CHALCONE SYNTHASE 2 (EC 2_3_1_74)
 2_3_1_79 7342 *Vibrio cholerae* El Tor N16961ORFA00562 PROBABLE MALTOSE O-ACETYLTRANSFERASE (EC 2_3_1_79)
 2_3_1_8 7412 *Yersinia pseudotuberculosis* PHOSPHATE ACETYLTRANSFERASE (EC 2_3_1_8)
 2_3_1_81 2161 *Bacillus subtilis* yokD AMINOGLYCOSIDE N3'-ACETYLTRANSFERASE III (EC 2_3_1_81)
 2_3_1_82 407 *Klebsiella pneumoniae* sp19650 AMINOGLYCOSIDE N6'-ACETYLTRANSFERASE (EC 2_3_1_82)
 2_3_1_84 7847 *Saccharomyces cerevisiae* ATF2 ALCOHOL O-ACETYLTRANSFERASE 2 (EC 2_3_1_84)
 2_3_1_85 3198 *Mycobacterium tuberculosis* fas FATTY ACID SYNTHASE (EC 2_3_1_85) [INCLUDES: EC 2_3_1_38; EC 2_3_1_39; EC 2_3_1_41; EC 1_1_1_100; EC 4_2_1_61; EC 1_3_1_10; EC 3_1_2_14]
 2_3_1_86 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3- HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 2_3_1_88 3462 *Saccharomyces cerevisiae* NAT2 N-TERMINAL ACETYLTRANSFERASE 2 (EC 2_3_1_88)
 2_3_1_94 3094 *Bordetella pertussis* ERYTHRONOLIDE SYNTHASE, MODULES 1 AND 2 (EC 2_3_1_94)
 2_4_1_10 84 *Streptococcus mutans* BS-sacB LEVANSUCRASE PRECURSOR (EC 2_4_1_10)
 2_4_1_109 2513 *Saccharomyces cerevisiae* YDR307W DOLICHYL-PHOSPHATE-MANNOSE--PROTEIN MANNOSYLTRANSFERASE 7 (EC 2_4_1_109)
 2_4_1_12 2745 *Salmonella typhi* CELLULOSE SYNTHASE (EC 2_4_1_12)
 2_4_1_131 178 *Saccharomyces cerevisiae* KRE2 GLYCOLIPID 2-ALPHA-MANNOSYLTRANSFERASE (EC 2_4_1_131)
 2_4_1_15 4715 *Salmonella typhimurium* otsA ALPHA,ALPHA-TREHALOSE-PHOSPHATE SYNTHASE (UDP-FORMING) (EC 2_4_1_15)
 2_4_1_157 1170 *Streptococcus pyogenes* BS-ypjH 1,2-DIACYLGLYCEROL 3-GLUCOSYLTRANSFERASE (EC 2_4_1_157)
 2_4_1_16 3550 *Saccharomyces cerevisiae* CHS3 CHITIN SYNTHASE 3 (EC 2_4_1_16)
 2_4_1_182 4488 *Yersinia pseudotuberculosis* EC-lpxB LIPID-A-DISACCHARIDE SYNTHASE (EC 2_4_1_182)
 2_4_1_19 2204 *Clostridium acetobutylicum* 19539818_C3_34 CYCLOMALTODEXTRIN GLUCANOTRANSFERASE (EC 2_4_1_19)
 2_4_1_20 554 *Clostridium acetobutylicum* 3126303_C3_47 CELLOBIOSE-PHOSPHORYLASE (EC 2_4_1_20)
 2_4_1_21 5634 *Yersinia pseudotuberculosis* EC-glga GLYCOGEN SYNTHASE (EC 2_4_1_21)
 2_4_1_25 6960 *Yersinia pseudotuberculosis* EC-malQ 4-ALPHA-GLUCANOTRANSFERASE (EC 2_4_1_25)
 2_4_1_33 1699 *Pseudomonas aeruginosa* PA3541 GLUCOSYL TRANSFERASE [probable ALGINATE SYNTHASE (EC 2_4_1_33)]
 2_4_1_34 982 *Saccharomyces cerevisiae* FKS3 PUTATIVE 1,3-BETA-GLUCAN SYNTHASE COMPONENT (EC 2_4_1_34)
 2_4_1_44 629 *Streptococcus pneumoniae* LIPOPOLYSACCHARIDE 1,3-GALACTOSYLTRANSFERASE (EC 2_4_1_44)
 2_4_1_5 218 *Streptococcus pneumoniae* GLUCOSYLTRANSFERASE-S (EC 2_4_1_5)
 2_4_1_52 642 *Streptococcus pneumoniae* PROBABLE POLY(GLYCEROL-PHOSPHATE) ALPHA-GLUCOSYLTRANSFERASE (EC 2_4_1_52)

2_4_1_56 782 *Salmonella typhimurium* waaK LIPOPOLYSACCHARIDE 1,2-N-
 ACETYLGLUCOSAMINETRANSFERASE (EC 2_4_1_56)
 2_4_1_58 537 *Streptococcus mutans* LIPOPOLYSACCHARIDE 1,2-GLUCOSYLTRANSFERASE (EC
 2_4_1_58)
 2_4_1_8 960 *Neisseria gonorrhoeae* BS-yvdK maltose phosphorylase (EC 2_4_1_8)
 2_4_2_17 7517 *Yersinia pseudotuberculosis* EC-hisG ATP PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_17)
 2_4_2_18 8101 *Yersinia pseudotuberculosis* EC-ybiB ANTHRANILATE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_18)
 2_4_2_2 1031 *Streptococcus pneumoniae* EC-deoA PYRIMIDINE-NUCLEOSIDE PHOSPHORYLASE (EC
 2_4_2_2)
 2_4_2_21 5062 *Vibrio cholerae* El Tor N16961 ORF01605 NICOTINATE-NUCLEOTIDE--
 DIMETHYLBENZIMIDAZOLE PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_21)
 2_4_2_22 6051 *Vibrio cholerae* El Tor N16961 ORF02888 XANTHINE-GUANINE
 PHOSPHORIBOSYLTRANSFERASE (EC 2_4_2_22)
 2_4_2_36 692 *Vibrio cholerae* El Tor N16961 ORF01870 CHOLERA ENTEROTOXIN, A CHAIN
 PRECURSOR (NAD(+)-DIPHTHAMIDE ADP- RIBOSYLTRANSFERASE) (EC 2_4_2_36)
 2_4_2_9 7828 *Yersinia pseudotuberculosis* URACIL PHOSPHORIBOSYLTRANSFERASE (EC
 2_4_2_9)
 2_5_1_15 5500 *Yersinia pseudotuberculosis* DIHYDROPTEROATE SYNTHASE (EC 2_5_1_15)
 2_5_1_17 6704 *Yersinia pseudotuberculosis* EC-btuR COB(I)ALAMIN ADENOSYLTRANSFERASE (EC
 2_5_1_17)
 2_5_1_19 5267 *Yersinia pseudotuberculosis* EC-aroA 3-PHOSPHOSHIKIMATE 1-
 CARBOXYVINYLTRANSFERASE (EC 2_5_1_19)
 2_5_1_29 7442 *Yersinia pseudotuberculosis* EC-ispA FARNESYL PYROPHOSPHATE SYNTHETASE (EC
 2_5_1_1)/GERANYLTRANSTRANSFERASE (EC 2_5_1_10); GERANYLGERANYL PYROPHOSPHATE
 SYNTHASE (EC 2_5_1_29)
 2_5_1_3 8137 *Yersinia pseudotuberculosis* EC-thiE THIAMIN-PHOSPHATE PYROPHOSPHORYLASE (EC
 2_5_1_3)
 2_5_1_30 121 *Enterococcus faecium* (DOE) HEPTAPRENYL DIPHOSPHATE SYNTHASE
 COMPONENT I (EC 2_5_1_30)
 2_5_1_31 970 *Yersinia pestis* BS-yluA UNDECAPRENYL PYROPHOSPHATE SYNTHETASE (EC
 2_5_1_31)
 2_5_1_7 7299 *Yersinia pseudotuberculosis* EC-murA UDP-N-ACETYLGLUCOSAMINE 1-
 CARBOXYVINYLTRANSFERASE (EC 2_5_1_7)
 2_5_1_8 7219 *Yersinia pseudotuberculosis* EC-miaA TRNA DELTA(2)-ISOPENTENYLPYROPHOSPHATE
 TRANSFERASE (EC 2_5_1_8)
 2_5_1_9 4806 *Yersinia pseudotuberculosis* EC-ribE RIBOFLAVIN SYNTHASE ALPHA CHAIN (EC
 2_5_1_9)
 2_6_1_11 5216 *Yersinia pseudotuberculosis* ACETYLORNITHINE AMINOTRANSFERASE (EC
 2_6_1_11)
 2_6_1_17 825 *Bordetella pertussis* BS-ykrV N-SUCCINYL-L,L-DAP AMINOTRANSFERASE (EC
 2_6_1_17)
 2_6_1_18 3304 *Pseudomonas aeruginosa* PA5313 OMEGA-AMINO ACID--PYRUVATE
 AMINOTRANSFERASE (EC 2_6_1_18)
 2_6_1_21 906 *Staphylococcus aureus*trjQ9KWZ6 D-ALANINE AMINOTRANSFERASE (EC 2_6_1_21)
 2_6_1_36 2852 *Mycobacterium tuberculosis* lat L-LYSINE-EPSILON AMINOTRANSFERASE (EC
 2_6_1_36)
 2_6_1_37 7110 *Vibrio cholerae* El Tor N16961ORFA00272 (2-aminoethyl)phosphonate--pyruvate transaminase
 (EC 2_6_1_37)
 2_6_1_46 7330 *Vibrio cholerae* El Tor N16961ORFA00548 DIAMINO BUTYRATE--PYRUVATE
 AMINOTRANSFERASE (EC 2_6_1_46)
 2_6_1_52 5066 *Yersinia pseudotuberculosis* PHOSPHOSERINE AMINOTRANSFERASE (EC 2_6_1_52)
 2_6_1_57 7907 *Yersinia pseudotuberculosis* EC-tyrB AROMATIC-AMINO-ACID AMINOTRANSFERASE
 (EC 2_6_1_57)
 2_6_1_62 6402 *Yersinia pseudotuberculosis* EC-bioA ADENOSYLMETHIONINE-8-AMINO-7-
 OXONONANOATE AMINOTRANSFERASE (EC 2_6_1_62)
 2_6_1_66 5309 *Yersinia pseudotuberculosis* EC-avtA VALINE--PYRUVATE AMINOTRANSFERASE (EC
 2_6_1_66)
 2_6_1_9 7519 *Yersinia pseudotuberculosis* EC-hisC HISTIDINOL-PHOSPHATE AMINOTRANSFERASE
 (EC 2_6_1_9)
 2_7_1_108 6646 *Saccharomyces cerevisiae* SEC59 DOLICHOL KINASE (EC 2_7_1_108)

- 2_7_1_116 7358 *Yersinia pseudotuberculosis* ISOCITRATE DEHYDROGENASE KINASE/PHOSPHATASE (IDH KINASE/PHOSPHATASE) (EC 2_7_1_116) (EC 3_1_3_-)
- 2_7_1_12 6601 *Yersinia pseudotuberculosis* THERMORESISTANT GLUCONOKINASE (EC 2_7_1_12)
- 2_7_1_130 7622 *Yersinia pseudotuberculosis* EC-ycaH TETRAACYLDISACCHARIDE 4'-KINASE (EC 2_7_1_130)
- 2_7_1_144 6436 *Yersinia pseudotuberculosis* EC-agaZ TAGATOSE 6-PHOSPHATE KINASE (EC 2_7_1_144)
- 2_7_1_15 4407 *Yersinia pseudotuberculosis* BS-rbsK RIBOKINASE (EC 2_7_1_15)
- 2_7_1_16 5545 *Yersinia pseudotuberculosis* EC-araB L-RIBULOKINASE (EC 2_7_1_16)
- 2_7_1_19 4335 *Yersinia pseudotuberculosis* PROBABLE PHOSPHORIBULOKINASE (EC 2_7_1_19)
- 2_7_1_2 4784 *Yersinia pseudotuberculosis* EC-yajF GLUCOKINASE (EC 2_7_1_2)
- 2_7_1_26 8052 *Yersinia pseudotuberculosis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_2_2)
- 2_7_1_29 5021 *Yersinia pseudotuberculosis* DIHYDROXYACETONE KINASE (EC 2_7_1_29)
- 2_7_1_31 5010 *Yersinia pseudotuberculosis* BS-yxaA GLYCERATE KINASE (EC 2_7_1_31)
- 2_7_1_33 5823 *Yersinia pseudotuberculosis* EC-coaA PANTOTHENATE KINASE (EC 2_7_1_33)
- 2_7_1_39 7400 *Yersinia pseudotuberculosis* HOMOSERINE KINASE (EC 2_7_1_39)
- 2_7_1_4 7162 *Vibrio cholerae* El Tor N16961ORFA00335 FRUCTOKINASE (EC 2_7_1_4)
- 2_7_1_45 5998 *Yersinia pseudotuberculosis* EC-kdgK 2-DEHYDRO-3-DEOXYGLUCONOKINASE (EC 2_7_1_45)
- 2_7_1_49 5490 *Yersinia pseudotuberculosis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
- 2_7_1_5 7798 *Yersinia pseudotuberculosis* EC-rhaB RHAMNULOKINASE (EC 2_7_1_5)
- 2_7_1_50 910 *Streptococcus pneumoniae* HYDROXYETHYLTHIAZOLE KINASE (EC 2_7_1_50)
- 2_7_1_51 6863 *Salmonella typhimurium* fucK L-FUCULOKINASE (EC 2_7_1_51)
- 2_7_1_53 376 *Salmonella paratyphi* CRYPTIC L-XYLULOSE KINASE (EC 2_7_1_53)
- 2_7_1_55 6308 *Escherichia coli* yjcT D-ALLOSE KINASE (EC 2_7_1_55)
- 2_7_1_56 4389 *Yersinia pseudotuberculosis* EC-fruK 1-PHOSPHOFRUCTOKINASE (EC 2_7_1_56)
- 2_7_1_58 5842 *Salmonella typhimurium* dgoK 2-DEHYDRO-3-DEOXYGALACTONOKINASE (EC 2_7_1_58)
- 2_7_1_60 56 *Yersinia pestis* EC-yhcl N-acetylmannosamine kinase (EC 2_7_1_60)
- 2_7_1_63 1471 *Mycobacterium tuberculosis* ppgK POLYPHOSPHATE GLUCOKINASE (EC 2_7_1_63)
- 2_7_1_66 4913 *Yersinia pseudotuberculosis* EC-bacA BACITRACIN RESISTANCE PROTEIN (PUTATIVE UNDECAPRENOL KINASE) (EC 2_7_1_66)
- 2_7_1_69 4239 *Yersinia pseudotuberculosis* PTS SYSTEM, N-ACETYLGUCOSAMINE-SPECIFIC IIABC COMPONENT (EC 2_7_1_69)
- 2_7_1_71 4441 *Yersinia pseudotuberculosis* EC-aroK SHIKIMATE KINASE I (EC 2_7_1_71)
- 2_7_1_73 4465 *Yersinia pseudotuberculosis* INOSINE-GUANOSINE KINASE (EC 2_7_1_73)
- 2_7_1_87 5727 *Salmonella typhi* STREPTOMYCIN 3'-KINASE (EC 2_7_1_87)
- 2_7_1_90 93 *Treponema pallidum* TP0542 PYROPHOSPHATE--FRUCTOSE 6-PHOSPHATE 1-PHOSPHOTRANSFERASE (EC 2_7_1_90)
- 2_7_1_92 8176 *Yersinia pseudotuberculosis* BS-iolC 5-DEHYDRO-2-DEOXYGLUCONOKINASE (EC 2_7_1_92)
- 2_7_1_95 524 *Streptococcus equi* PROBABLE AMINOGLYCOSIDE 3'-PHOSPHOTRANSFERASE (EC 2_7_1_95)
- 2_7_2_1 5604 *Yersinia pseudotuberculosis* EC-ackA ACETATE KINASE (EC 2_7_2_1)
- 2_7_2_2 1436 *Streptococcus pyogenes* arcC CARBAMATE KINASE (EC 2_7_2_2)
- 2_7_2_4 5312 *Yersinia pseudotuberculosis* EC-lysC LYSINE-SENSITIVE ASPARTOKINASE III (EC 2_7_2_4)
- 2_7_2_7 16 *Enterococcus faecalis* BS-yqiU BUTYRATE KINASE (EC 2_7_2_7)
- 2_7_2_8 7306 *Yersinia pseudotuberculosis* EC-argB ACETYLGLUTAMATE KINASE (EC 2_7_2_8)
- 2_7_3_3 1043 *Staphylococcus aureus* BS-yacI ARGININE KINASE (EC 2_7_3_3)
- 2_7_3_9 5194 *Yersinia pseudotuberculosis* EC-ptsI PHOSPHOENOLPYRUVATE-PROTEIN PHOSPHOTRANSFERASE (EC 2_7_3_9)
- 2_7_4_1 4919 *Yersinia pseudotuberculosis* EC-yfjB POLYPHOSPHATE KINASE (EC 2_7_4_1) / NAD⁺ KINASE (EC 2_7_1_23)
- 2_7_4_16 7439 *Yersinia pseudotuberculosis* BS-ydiA THIAMIN-MONOPHOSPHATE KINASE (EC 2_7_4_16)
- 2_7_4_7 5490 *Yersinia pseudotuberculosis* BS-yjbV PHOSPHOMETHYLPYRIMIDINE KINASE (EC 2_7_4_7) / HYDROXYMETHYLPYRIMIDINE KINASE (EC 2_7_1_49)
- 2_7_6_2 985 *Streptococcus pyogenes* BS-yloS THIAMIN PYROPHOSPHOKINASE (EC 2_7_6_2)

2_7_6_3 6004 *Yersinia pseudotuberculosis* EC-folK 2-AMINO-4-HYDROXY-6-HYDROXYMETHYLDIHYDROPTERIDINE PYROPHOSPHOKINASE (EC 2_7_6_3)
 2_7_6_5 7788 *Yersinia pseudotuberculosis* EC-relA GTP PYROPHOSPHOKINASE (EC 2_7_6_5)
 2_7_7_13 2591 *Saccharomyces cerevisiae* PSA1 MANNOSE-1-PHOSPHATE GUANYLTRANSFERASE (EC 2_7_7_13)
 2_7_7_14 6600 *Saccharomyces cerevisiae* MUQ1 CTP: PHOSPHOETHANOLAMINE CYTIDYLYLTRANSFERASE (EC 2_7_7_14)
 2_7_7_2 8052 *Yersinia pseudotuberculosis* EC-yaaC RIBOFLAVIN KINASE (EC 2_7_1_26) / FMN ADENYLYLTRANSFERASE (EC 2_7_7_2)
 2_7_7_22 2774 *Yersinia pestis* Q9RCC5 MANNOSE-6-PHOSPHATE ISOMERASE (EC 5_3_1_8) / MANNOSE-1-PHOSPHATE GUANYLYL TRANSFERASE (GDP) (EC 2_7_7_22)
 2_7_7_24 6241 *Yersinia pseudotuberculosis* EC-rffH GLUCOSE-1-PHOSPHATE THYMIDYLYLTRANSFERASE (EC 2_7_7_24)
 2_7_7_25 4553 *Yersinia pseudotuberculosis* EC-pcnB POLY(A) POLYMERASE (EC 2_7_7_19) / TRNA NUCLEOTIDYLYLTRANSFERASE (EC 2_7_7_25)
 2_7_7_27 7615 *Yersinia pseudotuberculosis* EC-glgC GLUCOSE-1-PHOSPHATE ADENYLYLTRANSFERASE (EC 2_7_7_27)
 2_7_7_3 5181 *Yersinia pseudotuberculosis* EC-kdtB PHOSPHOPANTETHEINE ADENYLYLTRANSFERASE (EC 2_7_7_3)
 2_7_7_33 222 *Yersinia pseudotuberculosis* GLUCOSE-1-PHOSPHATE CYTIDYLYLTRANSFERASE (EC 2_7_7_33)
 2_7_7_38 5728 *Yersinia pseudotuberculosis* EC-kdsB 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLYLTRANSFERASE (EC 2_7_7_38)
 2_7_7_40 853 *Streptococcus pneumoniae* BS-yacM D-ribitol-5-phosphate cytidyltransferase (EC 2_7_7_40)
 2_7_7_42 6017 *Yersinia pseudotuberculosis* EC-glnE GLUTAMATE-AMMONIA-LIGASE ADENYLYLTRANSFERASE (EC 2_7_7_42)
 2_7_7_46 626 *Klebsiella pneumoniae* 2"-AMINOGLYCOSIDE NUCLEOTIDYLYLTRANSFERASE (EC 2_7_7_46)
 2_7_7_47 1120 *Salmonella typhimurium* aadA STREPTOMYCIN 3"-ADENYLYLTRANSFERASE (EC 2_7_7_47)
 2_7_7_53 2264 *Saccharomyces cerevisiae* APA2 5',5"-P-1,P-4-TETRAPHOSPHATE PHOSPHORYLASE II (EC 2_7_7_53)
 2_7_7_59 6550 *Yersinia pseudotuberculosis* EC-glnD [PROTEIN-PII] URIDYLYLTRANSFERASE (EC 2_7_7_59)
 2_7_8_1 560 *Treponema pallidum* TP0671 ETHANOLAMINEPHOSPHOTRANSFERASE (EC 2_7_8_1)
 2_7_8_13 7940 *Yersinia pseudotuberculosis* EC-mraY PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE (EC 2_7_8_13)
 2_7_8_20 1794 *Salmonella typhimurium* mdoB PHOSPHOGLYCEROL TRANSFERASE I (EC 2_7_8_20)
 2_7_8_23 4666 *Salmonella dublin* PUTATIVE CARBOXYVINYL-CARBOXYPHOSPHONATE PHOSPHORYLMUTASE (EC 2_7_8_23)
 2_7_8_5 5889 *Yersinia pseudotuberculosis* CDP-DIACYLGLYCEROL--GLYCEROL-3-PHOSPHATE 3-PHOSPHATIDYLYLTRANSFERASE (EC 2_7_8_5)
 2_7_8_6 4143 *Vibrio cholerae* El Tor N16961 ORF00365 UNDECAPRENYL-PHOSPHATE GALACTOSEPHOSPHOTRANSFERASE (EC 2_7_8_6)
 2_7_8_7 1716 *Yersinia pestis* EC-acpS HOLO-[ACYL-CARRIER PROTEIN] SYNTHASE (EC 2_7_8_7)
 2_7_8_8 5969 *Yersinia pseudotuberculosis* EC-ppsA CDP-DIACYLGLYCEROL--SERINE O-PHOSPHATIDYLYLTRANSFERASE (EC 2_7_8_8)
 2_7_9_1 494 *Treponema pallidum* TP0746 PYRUVATE,PHOSPHATE DIKINASE (EC 2_7_9_1)
 2_7_9_2 7957 *Yersinia pseudotuberculosis* EC-ppsA PHOSPHOENOLPYRUVATE SYNTHASE (EC 2_7_9_2)
 2_8_1_6 7843 *Yersinia pseudotuberculosis* EC-bioB BIOTIN SYNTHASE (EC 2_8_1_6)
 2_8_2_22 2571 *Salmonella typhimurium* ARYLSULFATE SULFOTRANSFERASE (EC 2_8_2_22)
 2_8_3_1 1651 *Escherichia coli* ydiF propionate CoA-transferase (EC 2_8_3_1)
 2_8_3_12 4714 *Pseudomonas aeruginosa* PA0227 GLUTACONATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_12)
 2_8_3_3 7781 *Pseudomonas aeruginosa* mdca malonate CoA-transferase (EC 2_8_3_3) / malonyl-CoA decarboxylase (EC 4_1_1_9)
 2_8_3_6 5462 *Pseudomonas aeruginosa* PA2000 3-OXOADIPATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_6)
 2_8_3_8 1502 *Bordetella pertussis* butyryl-CoA:acetate coenzyme A transferase (EC 2_8_3_8)
 2_8_3_9 1522 *Porphyromonas gingivalis* EC-atoA BUTYRATE-ACETOACETATE COA-TRANSFERASE SUBUNIT B (EC 2_8_3_9)

- 2_9_1_1 7835 *Yersinia pseudotuberculosis* EC-selA L-SERYL-TRNA(SEC) SELENIUM TRANSFERASE (EC 2_9_1_1)
- 3_1_1_10 5017 *Yersinia pestis* TROPINESTERASE (EC 3_1_1_10)
- 3_1_1_11 4009 *Yersinia pestis* PECTINESTERASE A PRECURSOR (EC 3_1_1_11)
- 3_1_1_17 3906 *Salmonella typhimurium* GLUCONOLACTONASE (EC 3_1_1_17)
- 3_1_1_20 3532 *Klebsiella pneumoniae* TANNASE PRECURSOR (EC 3_1_1_20)
- 3_1_1_24 533 *Streptococcus mutans* 3-OXOADIPATE ENOL-LACTONASE (EC 3_1_1_24)
- 3_1_1_41 319 *Bacillus subtilis* cah CEPHALOSPORIN-C DEACETYLASE (EC 3_1_1_41)
- 3_1_1_45 5384 *Yersinia pseudotuberculosis* PUTATIVE CARBOXYMETHYLENEBUTENOLIDASE (EC 3_1_1_45)
- 3_1_1_57 1506 *Yersinia pestis* Q9ZC43 2-PYRONE-4,6-DICARBOXYLATE LACTONASE (EC 3_1_1_57)
- 3_1_1_61 4947 *Yersinia pseudotuberculosis* EC-cheB PROTEIN-GLUTAMATE METHYLESTERASE (EC 3_1_1_61)
- 3_1_1_72 970 *Streptococcus pneumoniae* acetylxyylan esterase (EC 3_1_1_72)
- 3_1_1_11 6283 *Yersinia pseudotuberculosis* EC-sbcB EXODEOXYRIBONUCLEASE I (EC 3_1_1_11)
- 3_1_1_13 1657 *Salmonella typhi* EXONUCLEASE (EC 3_1_1_13)
- 3_1_1_15 4547 *Yersinia pseudotuberculosis* EXODEOXYRIBONUCLEASE V GAMMA CHAIN (EC 3_1_1_15)
- 3_1_1_16 4498 *Yersinia pseudotuberculosis* EC-xseA EXODEOXYRIBONUCLEASE VII LARGE SUBUNIT (EC 3_1_1_16)
- 3_1_1_13 1035 *Saccharomyces cerevisiae* PAN3 PAB-DEPENDENT POLY(A)-SPECIFIC RIBONUCLEASE SUBUNIT PAN3 (EC 3_1_1_13)
- 3_1_2_14 431 *Streptococcus pyogenes* OLEOYL-ACYL CARRIER PROTEIN THIOESTERASE (EC 3_1_2_14)
- 3_1_2_12 4558 *Yersinia pseudotuberculosis* BS-yqfS ENDONUCLEASE IV (EC 3_1_2_12)
- 3_1_2_13 4292 *Yersinia pseudotuberculosis* TYPE I RESTRICTION ENZYME HSDR (EC 3_1_2_13)
- 3_1_2_14 154 *Ureaplasma urealyticum* UU036 TYPE IIS RESTRICTION ENZYME ECO57I (EC 3_1_2_14)
- 3_1_2_15 2715 *Salmonella typhimurium* res TYPE III RESTRICTION-MODIFICATION SYSTEM STYLT I ENZYME RES (EC 3_1_2_15)
- 3_1_2_24 7017 *Yersinia pseudotuberculosis* EC-ruvC CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE RUV C (EC 3_1_2_24)
- 3_1_2_1 1460 *Pasteurella multocida* ENDONUCLEASE V (EC 3_1_2_1)
- 3_1_2_1 3086 *Saccharomyces cerevisiae* RNY1 RIBONUCLEASE TRV (EC 3_1_2_1)
- 3_1_2_3 1446 *Corynebacterium diphtheriae* GUANYL-SPECIFIC RIBONUCLEASE SA3 (EC 3_1_2_3)
- 3_1_2_6 890 *Salmonella typhimurium* msA RIBONUCLEASE I PRECURSOR (EC 3_1_2_6)
- 3_1_3_10 1010 *Salmonella typhimurium* agp GLUCOSE-1-PHOSPHATASE PRECURSOR (EC 3_1_3_10)
- 3_1_3_12 2803 *Salmonella typhimurium* otsB TREHALOSE-PHOSPHATASE (EC 3_1_3_12)
- 3_1_3_15 7520 *Yersinia pseudotuberculosis* HISTIDINOL-PHOSPHATASE (EC 3_1_3_15)
- 3_1_3_27 4737 *Yersinia pseudotuberculosis* EC-pgpB PHOSPHATIDYLGLYCEROPHOSPHATASE B (EC 3_1_3_27)
- 3_1_3_33 4737 *Saccharomyces cerevisiae* CTL1 POLYNUCLEOTIDE 5'-TRIPHOSPHATASE (EC 3_1_3_33)
- 3_1_3_43 5464 *Saccharomyces cerevisiae* PTC5 [PYRUVATE DEHYDROGENASE (LIPOAMIDE) (PDP) (EC 3_1_3_43)
- 3_1_3_68 324 *Saccharomyces cerevisiae* DOG1 2-DEOXYGLUCOSE-6-PHOSPHATE PHOSPHATASE I (EC 3_1_3_68)
- 3_1_3_2 6201 *Salmonella typhimurium* NUCLEASE PRECURSOR (EC 3_1_3_2)
- 3_1_3_1 407 *Staphylococcus aureus* THERMONUCLEASE PRECURSOR (EC 3_1_3_1)
- 3_1_4_14 6761 *Yersinia pseudotuberculosis* EC-acpD [acyl-carrier-protein] phosphodiesterase (EC 3_1_4_14)
- 3_1_4_16 7144 *Yersinia pseudotuberculosis* EC-cpdB 2',3'-CYCLIC-NUCLEOTIDE 2'-PHOSPHODIESTERASE PRECURSOR (EC 3_1_4_16)
- 3_1_4_3 2654 *Staphylococcus aureus* PHOSPHOLIPASE C PRECURSOR (EC 3_1_4_3)
- 3_1_5_1 7234 *Yersinia pseudotuberculosis* DEOXYGUANOSINETRIPHOSPHATE TRIPHOSPHOHYDROLASE (EC 3_1_5_1)
- 3_1_6_6 559 *Pseudomonas aeruginosa* betC CHOLINE-SULFATASE (EC 3_1_6_6)
- 3_1_7_2 7363 *Yersinia pseudotuberculosis* BS-relA GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE (EC 3_1_7_2)
- 3_1_1_1 7112 *Vibrio cholerae* El Tor N16961ORFA00274 phosphonoacetaldehyde hydrolase (EC 3_1_1_1)
- 3_1_1_2 5981 *Bordetella bronchiseptica* PHOSPHONOACETATE HYDROLASE (EC 3_1_1_2)
- 3_2_1_11 139 *Streptococcus mutans* DEXTRANASE PRECURSOR (EC 3_2_1_11)
- 3_2_1_122 6142 *Escherichia coli* glvG MALTOSE-6'-PHOSPHATE GLUCOSIDASE (EC 3_2_1_122)

- 3_2_1_135 516 *Clostridium difficile* BS-yvdF NEOPULLULANASE (EC 3_2_1_135)
 3_2_1_141 1364 *Salmonella typhimurium* MALTOOLIGOSYLTREHALOSE TREHALOHYDROLASE (EC 3_2_1_141)
 3_2_1_15 1800 *Streptococcus pneumoniae* POLYGALACTURONASE (EC 3_2_1_15)
 3_2_1_26 7161 *Vibrio cholerae* El Tor N16961ORFA00334 SUCROSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_26)
 3_2_1_3 661 *Saccharomyces cerevisiae* SGA1 GLUCOAMYLASE, INTRACELLULAR SPORULATION-SPECIFIC (EC 3_2_1_3)
 3_2_1_4 5496 *Yersinia pseudotuberculosis* EC-yhjM ENDOGLUCANASE (EC 3_2_1_4)
 3_2_1_41 197 *Streptococcus pyogenes* pulA PULLULANASE (EC 3_2_1_41)
 3_2_1_54 769 *Streptococcus pyogenes* amyB CYCLOMALTODEXTRINASE (EC 3_2_1_54)
 3_2_1_55 2898 *Enterococcus faecium* (DOE) BS-abfA ALPHA-L-ARABINOFURANOSIDASE 1 (EC 3_2_1_55)
 3_2_1_58 3283 *Saccharomyces cerevisiae* EXG1 GLUCAN 1,3-BETA-GLUCOSIDASE I/II PRECURSOR (EC 3_2_1_58)
 3_2_1_65 3452 *Clostridium acetobutylicum* 23600003_F1_2 LEVANASE (EC 3_2_1_65)
 3_2_1_70 48 *Streptococcus pyogenes* dexB GLUCAN 1,6-ALPHA-GLUCOSIDASE (EC 3_2_1_70)
 3_2_1_73 1672 *Streptococcus mutans* EC-yhjM BETA-GLUCANASE PRECURSOR (EC 3_2_1_73)
 3_2_1_74 2831 *Clostridium acetobutylicum* 35394681_F1_1 glucan 1,4-beta-glucosidase (EC 3_2_1_74)
 3_2_1_78 939 *Clostridium acetobutylicum* 5267842_C2_39 MANNAN ENDO-1,4-BETA-MANNOSIDASE A AND B (EC 3_2_1_78)
 3_2_1_8 6615 *Vibrio cholerae* El Tor N16961ORFA01011 ENDO-1,4-BETA-XYLANASE A PRECURSOR (EC 3_2_1_8)
 3_2_1_80 532 *Streptococcus mutans* FRUCTAN BETA-FRUCTOSIDASE PRECURSOR (EC 3_2_1_80)
 3_2_1_81 2950 *Pseudomonas aeruginosa* PA1046 BETA-AGARASE B (EC 3_2_1_81)
 3_2_1_83 51 *Clostridium acetobutylicum* 22439426_F3_127 KAPPA-CARRAGEENASE (EC 3_2_1_83)
 3_2_1_85 168 *Streptococcus pyogenes* lacG 6-PHOSPHO-BETA-GALACTOSIDASE (EC 3_2_1_85)
 3_2_1_86 6489 *Yersinia pseudotuberculosis* EC-bglA 6-PHOSPHO-BETA-GLUCOSIDASE BGLA (EC 3_2_1_86)
 3_2_1_89 4501 *Yersinia pseudotuberculosis* ARABINOGLACTAN ENDO-1,4-BETA-GALACTOSIDASE PRECURSOR (EC 3_2_1_89)
 3_2_1_91 101 *Neurospora crassa* CBH-1 EXOGLUCANASE I PRECURSOR (EC 3_2_1_91)
 3_2_1_93 5327 *Yersinia pseudotuberculosis* EC-treC TREHALOSE-6-PHOSPHATE HYDROLASE (EC 3_2_1_93)
 3_2_1_99 2875 *Bacillus subtilis* abnA ARABINAN ENDO-1,5-ALPHA-L-ARABINOSIDASE A (EC 3_2_1_99)
 3_2_2_1 1353 *Staphylococcus aureus* EC-yaaF INOSINE-URIDINE PREFERRING NUCLEOSIDE HYDROLASE (EC 3_2_2_1)
 3_2_2_20 8086 *Yersinia pseudotuberculosis* DNA-3-METHYLADENINE GLYCOSYLASE (EC 3_2_2_20)
 3_2_2_23 5180 *Yersinia pseudotuberculosis* EC-mutM FORMAMIDOPYRIMIDINE-DNA GLYCOSYLASE (EC 3_2_2_23)
 3_2_2_4 6262 *Yersinia pseudotuberculosis* AMP NUCLEOSIDASE (EC 3_2_2_4)
 3_2_2_9 7233 *Yersinia pseudotuberculosis* BS-yrrU 5'-METHYLTHIOADENOSINE NUCLEOSIDASE (EC 3_2_2_16) / S-ADENOSYLHOMOCYSTEINE NUCLEOSIDASE (EC 3_2_2_9)
 3_3_2_1 4626 *Vibrio cholerae* El Tor N16961 ORF01033 ISOCHORISMATASE (EC 3_3_2_1)
 3_4_11_10 7319 *Vibrio cholerae* El Tor N16961ORFA00535 BACTERIAL LEUCYL AMINOPEPTIDASE PRECURSOR (EC 3_4_11_10)
 3_4_11_12 256 *Bordetella pertussis* AMINOPEPTIDASE II (EC 3_4_11_12)
 3_4_11_19 7020 *Pseudomonas aeruginosa* PA1486 D-AMINOPEPTIDASE (EC 3_4_11_19)
 3_4_14_11 298 *Streptococcus pyogenes* pepXP XAA-PRO DIPEPTIDYL-PEPTIDASE (EC 3_4_14_11)
 3_4_15_5 354 *Salmonella typhimurium* dcp PEPTIDYL-DIPEPTIDASE DCP (EC 3_4_15_5)
 3_4_16_4 5028 *Yersinia pseudotuberculosis* D-ALANYL-D-ALANINE CARBOXYPEPTIDASE (EC 3_4_16_4)
 3_4_16_6 1841 *Saccharomyces cerevisiae* KEX1 CARBOXYPEPTIDASE KEX1 PRECURSOR (EC 3_4_16_6)
 3_4_17_11 2633 *Pseudomonas aeruginosa* cpg2 CARBOXYPEPTIDASE G2 PRECURSOR (EC 3_4_17_11)
 3_4_17_19 6941 *Yersinia pseudotuberculosis* BS-ypwA THERMOSTABLE CARBOXYPEPTIDASE I (EC 3_4_17_19)
 3_4_17_4 2244 *Saccharomyces cerevisiae* CPSI CARBOXYPEPTIDASE S PRECURSOR (EC 3_4_17_4)
 3_4_19_3 5540 *Yersinia pseudotuberculosis* PYRROLIDONE-CARBOXYLATE PEPTIDASE (EC 3_4_19_3)

3_4_19_5 3689 *Salmonella typhimurium* iadA ISOASPARTYL DIPEPTIDASE (EC 3_4_19_5)
 3_4_21_48 2655 *Saccharomyces cerevisiae* PRB1 CEREVISIN PRECURSOR (EC 3_4_21_48)
 3_4_21_50 3933 *Pseudomonas aeruginosa* PA4175 PROTEASE I PRECURSOR (EC 3_4_21_50)
 3_4_21_61 2851 *Saccharomyces cerevisiae* KEX2 KEXIN PRECURSOR (EC 3_4_21_61)
 3_4_21_62 1030 *Bacillus subtilis* aprE SUBTILISIN E PRECURSOR (EC 3_4_21_62)
 3_4_21_72 1680 *Neisseria gonorrhoeae* IMMUNOGLOBULIN A1 PROTEASE (EC 3_4_21_72)
 3_4_21_87 4520 *Escherichia coli* ompT PROTEASE VII PRECURSOR (EC 3_4_21_87)
 3_4_21_88 6837 *Yersinia pseudotuberculosis* EC-lexA LEXA REPRESSOR (EC 3_4_21_88)
 3_4_22_37 1707 *Porphyromonas gingivalis* O33441 ARGININE-SPECIFIC CYSTEINE PROTEINASE RGP-2 (EC 3_4_22_37)
 3_4_23_23 20437 *Neurospora crassa* MUCOROPEPSIN PRECURSOR (EC 3_4_23_23)
 3_4_23_25 1788 *Saccharomyces cerevisiae* PEP4 SACCHAROPEPSIN PRECURSOR (EC 3_4_23_25)
 3_4_23_35 4561 *Saccharomyces cerevisiae* BARI BARRIERPEPSIN PRECURSOR (EC 3_4_23_35)
 3_4_23_36 8054 *Yersinia pseudotuberculosis* EC-lspA LIPOPROTEIN SIGNAL PEPTIDASE (EC 3_4_23_36)
 3_4_24_25 7371 *Vibrio cholerae* El Tor NI6961ORFA00596 NEUTRAL PROTEASE PRECURSOR (EC 3_4_24_25)
 3_4_24_26 7085 *Pseudomonas aeruginosa* lasB PSEUDOLYSIN PRECURSOR (EC 3_4_24_26)
 3_4_24_28 1628 *Enterococcus faecalis* BACILLOLYSIN PRECURSOR (EC 3_4_24_28)
 3_4_24_3 244 *Streptococcus pyogenes* BS-yyrN COLLAGENASE (EC 3_4_24_3)
 3_4_24_36 20058 *Neurospora crassa* LEISHMANOLYSIN PRECURSOR (EC 3_4_24_36)
 3_4_24_37 4431 *Saccharomyces cerevisiae* PRD1 SACCHAROLYSIN (EC 3_4_24_37)
 3_4_24_55 4959 *Yersinia pseudotuberculosis* BS-ymfH PROTEASE III PRECURSOR (EC 3_4_24_55)
 3_4_24_57 4630 *Yersinia pseudotuberculosis* O-SIALOGLYCOPROTEIN ENDOPEPTIDASE (EC 3_4_24_57)
 3_4_24_70 7926 *Yersinia pseudotuberculosis* EC-prIC OLIGOPEPTIDASE A (EC 3_4_24_70)
 3_4_24_75 3190 *Staphylococcus aureus* LYSOSTAPHIN PRECURSOR (EC 3_4_24_75)
 3_5_1_1 4155 *Yersinia pseudotuberculosis* EC-ansB L-ASPARAGINASE II PRECURSOR (EC 3_5_1_1)
 3_5_1_10 4326 *Yersinia pseudotuberculosis* FORMYLTETRAHYDROFOLATE DEFORMYLASE (EC 3_5_1_10)
 3_5_1_11 2811 *Staphylococcus aureus* BS-yxel PENICILLIN ACYLASE (EC 3_5_1_11)
 3_5_1_16 4279 *Yersinia pseudotuberculosis* EC-argE ACETYLORNITHINE DEACETYLASE (EC 3_5_1_16)
 3_5_1_18 7425 *Yersinia pseudotuberculosis* EC-dapE SUCCINYL-DIAMINOPIMELATE DESUCCINYLAISE (EC 3_5_1_18)
 3_5_1_19 5821 *Yersinia pseudotuberculosis* EC-ydJB PYRAZINAMIDASE/NICOTINAMIDASE [INCLUDES: PYRAZINAMIDASE (EC 3_5_1_19) / NICOTINAMIDASE (EC 3_5_1_19)]
 3_5_1_23 933 *Pseudomonas aeruginosa* PA0845 ALKALINE CERAMIDASE (EC 3_5_1_23)
 3_5_1_24 7383 *Vibrio cholerae* El Tor NI6961ORFA00610 CHOLYLGLYCINE HYDROLASE (EC 3_5_1_24)
 3_5_1_25 5703 *Yersinia pseudotuberculosis* N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE (EC 3_5_1_25)
 3_5_1_32 20244 *Neurospora crassa* HIPPURATE HYDROLASE (EC 3_5_1_32)
 3_5_1_33 1494 *Streptococcus pneumoniae* peptidoglycan N-acetylglucosamine deacetylase (EC 3_5_1_33)
 3_5_1_38 725 *Pseudomonas aeruginosa* ansB GLUTAMINASE-ASPARAGINASE (EC 3_5_1_38)
 3_5_1_4 6585 *Saccharomyces cerevisiae* AMD2 AMIDASE (EC 3_5_1_4)
 3_5_1_41 2609 *Saccharomyces cerevisiae* CDA1 CHITIN DEACETYLASE 2 (EC 3_5_1_41)
 3_5_1_46 423 *Pseudomonas aeruginosa* PA5542 6-AMINOHEXANOATE-DIMER HYDROLASE (EC 3_5_1_46)
 3_5_1_49 3660 *Bordetella pertussis* FORMAMIDASE (EC 3_5_1_49)
 3_5_1_5 6613 *Yersinia pseudotuberculosis* UREASE ALPHA SUBUNIT (EC 3_5_1_5)
 3_5_1_54 4285 *Yersinia pseudotuberculosis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) / ALLOPHANATE HYDROLASE (EC 3_5_1_54)
 3_5_1_59 2726 *Staphylococcus aureus* BS-yaal N-CARBAMOYLSARCOSINE AMIDASE (EC 3_5_1_59)
 3_5_1_68 7027 *Yersinia pseudotuberculosis* N-formylglutamate deformylase (EC 3_5_1_68)
 3_5_1_78 6658 *Salmonella typhimurium* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) / GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 3_5_1_80 6605 *Escherichia coli* agaA N-acetylgalactosamine-6-phosphate deacetylase (EC 3_5_1_80)
 3_5_1_81 6947 *Klebsiella pneumoniae* D-AMINOACYLASE (EC 3_5_1_81)
 3_5_1_82 637 *Mycobacterium tuberculosis* Rv2913c N-ACYL-D-GLUTAMATE DEACYLASE (EC 3_5_1_82)
 3_5_2_10 360 *Mycobacterium tuberculosis* Rv0695 creatininase (EC 3_5_2_10)

3_5_2_12 903 *Streptococcus pyogenes* *amiC* 6-AMINOHEXANOATE-CYCLIC-DIMER HYDROLASE (EC 3_5_2_12)
 3_5_2_14 4214 *Saccharomyces cerevisiae* YKL215C N-methylhydantoinase (ATP-hydrolyzing) (EC 3_5_2_14) / 5-OXOPROLINASE (EC 3_5_2_9)
 3_5_2_5 5495 *Salmonella typhimurium* ALLANTOINASE (EC 3_5_2_5)
 3_5_2_6 2373 *Yersinia pestis* BETA-LACTAMASE PRECURSOR, TYPE II (EC 3_5_2_6)
 3_5_2_7 7028 *Yersinia pseudotuberculosis* BS-hutI IMIDAZOLONEPROPIONASE (EC 3_5_2_7)
 3_5_3_11 7320 *Vibrio cholerae* El Tor N16961 ORFA00536 AGMATINASE (EC 3_5_3_11)
 3_5_3_19 6600 *Salmonella typhimurium* *glxA2* UREIDOGLYCOLATE HYDROLASE (EC 3_5_3_19)
 3_5_3_4 2548 *Saccharomyces cerevisiae* DAL2 ALLANTOICASE (EC 3_5_3_4)
 3_5_3_6 4290 *Vibrio cholerae* El Tor N16961 ORF00596 ARGININE DEIMINASE (EC 3_5_3_6)
 3_5_3_8 5030 *Vibrio cholerae* El Tor N16961 ORF01564 FORMIMINOGLUTAMASE (EC 3_5_3_8)
 3_5_3_9 6912 *Yersinia pseudotuberculosis* BS-yurH allantoate deiminase (EC 3_5_3_9)
 3_5_4_1 7885 *Yersinia pseudotuberculosis* CYTOSINE DEAMINASE (EC 3_5_4_1)
 3_5_4_13 6177 *Yersinia pseudotuberculosis* DEOXYCYTIDINE TRIPHOSPHATE DEAMINASE (EC 3_5_4_13)
 3_5_4_19 6635 *Yersinia pseudotuberculosis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_5_4_2 799 *Klebsiella pneumoniae* ADENINE DEAMINASE (EC 3_5_4_2)
 3_5_4_23 1867 *Clostridium acetobutylicum* 4812802_C2_34 BLASTICIDIN-S DEAMINASE (EC 3_5_4_23)
 3_5_4_25 5338 *Yersinia pseudotuberculosis* EC-ribB GTP CYCLOHYDROLASE II (EC 3_5_4_25)
 3_5_4_26 4162 *Yersinia pseudotuberculosis* EC-ribD DIAMINOHYDROXYPHOSPHORIBOSYLAMINOPYRIMIDINE DEAMINASE (EC 3_5_4_26) / 5-AMINO-6-(5-PHOSPHORIBOSYLAMINO)URACIL REDUCTASE (EC 1_1_1_193)
 3_5_5_1 1428 *Streptococcus mutans* BS-ykrU NITRILASE (EC 3_5_5_1)
 3_5_5_7 471 *Saccharomyces cerevisiae* NIT1 ALIPHATIC NITRILASE (EC 3_5_5_7)
 3_6_1_10 7046 *Saccharomyces cerevisiae* PHM5 alkaline phosphatase vacuolar precursor (EC 3_1_3_1) / endopolyphosphatase vacuolar precursor (EC 3_6_1_10)
 3_6_1_11 8103 *Yersinia pseudotuberculosis* EXOPOLYPHOSPHATASE (EC 3_6_1_11)
 3_6_1_22 3886 *Escherichia coli* *yjaD* NADH PYROPHOSPHATASE (EC 3_6_1_22)
 3_6_1_26 7057 *Yersinia pseudotuberculosis* CDP-DIACYLGLYCEROL PYROPHOSPHATASE (EC 3_6_1_26)
 3_6_1_31 6635 *Yersinia pseudotuberculosis* EC-hisI PHOSPHORIBOSYL-AMP CYCLOHYDROLASE (EC 3_5_4_19) / PHOSPHORIBOSYL-ATP PYROPHOSPHOHYDROLASE (EC 3_6_1_31)
 3_6_1_35 5832 *Saccharomyces cerevisiae* PMA2 PLASMA MEMBRANE ATPASE 2 (EC 3_6_1_35)
 3_6_1_40 6862 *Yersinia pseudotuberculosis* EC-gppA GUANOSINE-5'-TRIPHOSPHATE, 3'-DIPHOSPHATE PYROPHOSPHATASE (EC 3_6_1_40)
 3_6_1_41 6276 *Yersinia pseudotuberculosis* EC-apaH BIS(5'-NUCLEOSYL)-TETRAPHOSPHATASE (SYMMETRICAL) (EC 3_6_1_41)
 3_6_1_45 3730 *Yersinia pestis* UDP-SUGAR HYDROLASE PRECURSOR (EC 3_6_1_45)
 3_6_3_12 859 *Salmonella dublin* POTASSIUM-TRANSPORTING ATPASE B CHAIN (EC 3_6_3_12)
 3_7_1_3 1374 *Saccharomyces cerevisiae* YLR231C KYNURENINASE, L-KYNURENINE HYDROLASE (EC 3_7_1_3)
 3_7_1_5 4076 *Salmonella typhimurium* fumarylpyruvate hydrolase (EC 3_7_1_5)
 3_8_1_2 4935 *Yersinia pseudotuberculosis* 2-HALOALKANOIC ACID DEHALOGENASE I (EC 3_8_1_2)
 3_8_1_3 5385 *Salmonella typhimurium* HALOACETATE DEHALOGENASE H-1 (EC 3_8_1_3)
 3_8_1_5 758 *Mycobacterium tuberculosis* Rv2296 HALOALKANE DEHALOGENASE (EC 3_8_1_5)
 4_1_1_1 4824 *Saccharomyces cerevisiae* PDC6 PYRUVATE DECARBOXYLASE ISOZYME 3 (EC 4_1_1_1)
 4_1_1_11 7186 *Yersinia pseudotuberculosis* EC-panD ASPARTATE 1-DECARBOXYLASE PRECURSOR (EC 4_1_1_11)
 4_1_1_18 611 *Vibrio cholerae* El Tor N16961 ORF00395 LYSINE DECARBOXYLASE, INDUCIBLE (EC 4_1_1_18)
 4_1_1_19 4352 *Yersinia pseudotuberculosis* EC-speA BIOSYNTHETIC ARGININE DECARBOXYLASE (EC 4_1_1_19)
 4_1_1_2 1184 *Streptococcus mutans* OXALATE DECARBOXYLASE (EC 4_1_1_2)
 4_1_1_20 7661 *Yersinia pseudotuberculosis* EC-lysA DIAMINOPIMELATE DECARBOXYLASE (EC 4_1_1_20)
 4_1_1_25 20388 *Neurospora crassa* TYROSINE DECARBOXYLASE 4 (EC 4_1_1_25)
 4_1_1_3 4412 *Vibrio cholerae* El Tor N16961 ORF00764 OXALOACETATE DECARBOXYLASE ALPHA CHAIN (EC 4_1_1_3)

4_1_1_31 5142 *Yersinia pseudotuberculosis* PHOSPHOENOLPYRUVATE CARBOXYLASE (EC 4_1_1_31)
 4_1_1_36 6572 *Yersinia pseudotuberculosis* BS-yloI PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC 6_3_2_5) / PHOSPHOPANTOTHENOYL-CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 4_1_1_39 1360 *Bacillus subtilis* ykrW RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN (EC 4_1_1_39)
 4_1_1_4 674 *Clostridium acetobutylicum* 26181517_C1_30 ACETOACETATE DECARBOXYLASE (EC 4_1_1_4)
 4_1_1_41 849 *Streptococcus pyogenes* methylmalonyl-CoA decarboxylase gamma chain (EC 4_1_1_41)
 4_1_1_44 4250 *Yersinia pseudotuberculosis* 4-CARBOXYMUCONOLACTONE DECARBOXYLASE (EC 4_1_1_44)
 4_1_1_47 6602 *Salmonella typhimurium* gcl GLYOXYLATE CARBOLIGASE (EC 4_1_1_47)
 4_1_1_48 6735 *Yersinia pseudotuberculosis* EC-trpC INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE (EC 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 4_1_1_49 6832 *Yersinia pseudotuberculosis* EC-pckA PHOSPHOENOLPYRUVATE CARBOXYKINASE (ATP) (EC 4_1_1_49)
 4_1_1_5 5395 *Vibrio cholerae* El Tor N16961 ORF02026 ALPHA-ACETOLACTATE DECARBOXYLASE (EC 4_1_1_5)
 4_1_1_55 3306 *Bordetella pertussis* 4,5-DIHYDROXYPHTHALATE DECARBOXYLASE (EC 4_1_1_55)
 4_1_1_61 365 *Bacillus subtilis* ylcC 4-HYDROXYBENZOATE DECARBOXYLASE (EC 4_1_1_61)
 4_1_1_7 5394 *Pseudomonas aeruginosa* mdIC BENZOYLFORMATE DECARBOXYLASE (EC 4_1_1_7)
 4_1_1_71 8096 *Yersinia pseudotuberculosis* EC-menD 2-SUCCINYL-6-HYDROXY-2,4-CYCLOHEXADIENE-1-CARBOXYLATE SYNTHASE / 2-OXOGLUTARATE DECARBOXYLASE (EC 4_1_1_71)
 4_1_1_74 1692 *Staphylococcus aureus* EC-ilyB INDOLE-3-PYRUVATE DECARBOXYLASE (EC 4_1_1_74)
 4_1_1_8 5464 *Mycobacterium tuberculosis* oxaA OXALYL-COA DECARBOXYLASE (EC 4_1_1_8)
 4_1_1_9 7781 *Pseudomonas aeruginosa* mdcA malonate CoA-transferase (EC 2_8_3_3) / malonyl-CoA decarboxylase (EC 4_1_1_9)
 4_1_2_14 6410 *Yersinia pseudotuberculosis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_2_15 5531 *Yersinia pseudotuberculosis* PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE, PHE-SENSITIVE (EC 4_1_2_15)
 4_1_2_16 6231 *Yersinia pseudotuberculosis* EC-kdsA 2-DEHYDRO-3-DEOXYPHOSPHOCTONATE ALDOLASE (EC 4_1_2_16)
 4_1_2_17 6744 *Yersinia pseudotuberculosis* BS-ykrY L-FUCULOSE PHOSPHATE ALDOLASE (EC 4_1_2_17)
 4_1_2_19 7795 *Yersinia pseudotuberculosis* EC-rhaD RHAMNULOSE-1-PHOSPHATE ALDOLASE (EC 4_1_2_19)
 4_1_2_20 4593 *Salmonella typhimurium* 2-DEHYDRO-3-DEOXYGLUCARATE ALDOLASE (EC 4_1_2_20)
 4_1_2_21 110 *Salmonella paratyphi* 2-DEHYDRO-3-DEOXYPHOSPHOGALACTONATE ALDOLASE (EC 4_1_2_21) / GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_1_2_25 3510 *Yersinia pestis* EC-ygiG DIHYDRONEOPTERIN ALDOLASE (EC 4_1_2_25)
 4_1_2_29 3960 *Bacillus subtilis* iolJ 5-DEHYDRO-2-DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_29)
 4_1_2_40 421 *Streptococcus pyogenes* lacD_1 TAGATOSE 1,6-DIPHOSPHATE ALDOLASE (EC 4_1_2_40)
 4_1_2_5 2794 *Staphylococcus aureus* LOW-SPECIFICITY THREONINE ALDOLASE (EC 4_1_2_5)
 4_1_3_1 7359 *Yersinia pseudotuberculosis* EC-aceA ISOCITRATE LYASE (EC 4_1_3_1)
 4_1_3_12 4182 *Yersinia pseudotuberculosis* EC-leuA 2-ISOPROPYLMALATE SYNTHASE (EC 4_1_3_12)
 4_1_3_16 6410 *Yersinia pseudotuberculosis* 4-HYDROXY-2-OXOGLUTARATE ALDOLASE (EC 4_1_3_16) / 2-DEHYDRO-3- DEOXYPHOSPHOGLUCONATE ALDOLASE (EC 4_1_2_14)
 4_1_3_19 1019 *Treponema pallidum* TP0562 N-ACETYLNEURAMINATE SYNTHASE (EC 4_1_3_19)
 4_1_3_2 7360 *Yersinia pseudotuberculosis* EC-aceB MALATE SYNTHASE A (EC 4_1_3_2)
 4_1_3_21 1649 *Clostridium acetobutylicum* 4775328_C2_27 HOMOCITRATE SYNTHASE, OMEGA SUBUNIT (EC 4_1_3_21)
 4_1_3_27 199 *Yersinia pseudotuberculosis* EC-trpE ANTHRANILATE SYNTHASE COMPONENT I (EC 4_1_3_27)
 4_1_3_3 6064 *Yersinia pseudotuberculosis* EC-nanA N-ACETYLNEURAMINATE LYASE SUBUNIT (EC 4_1_3_3)
 4_1_3_30 5161 *Vibrio cholerae* El Tor N16961 ORF01725 methylisocitrate lyase (EC 4_1_3_30)

4_1_3_31 119 *Yersinia pestis* EC-gltA 2-methylcitrate synthase (EC 4_1_3_31)
 4_1_3_34 287 *Streptococcus pyogenes* citE CITRATE LYASE BETA CHAIN (EC 4_1_3_6) / CITRYL-COA LYASE SUBUNIT (EC 4_1_3_34)
 4_1_3_36 8098 *Yersinia pseudotuberculosis* EC-menB NAPHTHOATE SYNTHASE (EC 4_1_3_36)
 4_1_3_6 6671 *Yersinia pseudotuberculosis* CITRATE LYASE BETA CHAIN (EC 4_1_3_6)
 4_1_3_7 4686 *Yersinia pseudotuberculosis* EC-gltA CITRATE SYNTHASE (EC 4_1_3_7)
 4_1_99_1 522 *Vibrio cholerae* El Tor N16961ORFA01101 TRYPTOPHANASE (EC 4_1_99_1)
 4_1_99_2 456 *Porphyromonas gingivalis* TYROSINE PHENOL-LYASE (EC 4_1_99_2)
 4_1_99_4 7712 *Yersinia pseudotuberculosis* PUTATIVE L-AMINOCYCLOPROPANE-L-CARBOXYLATE DEAMINASE (EC 4_1_99_4)
 4_2_1_10 7491 *Yersinia pseudotuberculosis* BS-yqhS 3-DEHYDROQUINATE DEHYDRATASE (EC 4_2_1_10)
 4_2_1_12 6871 *Yersinia pseudotuberculosis* PHOSPHOGLUCONATE DEHYDRATASE (EC 4_2_1_12)
 4_2_1_14 7381 *Vibrio cholerae* El Tor N16961ORFA00608 D-SERINE DEHYDRATASE (EC 4_2_1_14)
 4_2_1_16 4837 *Yersinia pseudotuberculosis* THREONINE DEHYDRATASE BIOSYNTHETIC PRECURSOR (EC 4_2_1_16)
 4_2_1_19 6125 *Yersinia pseudotuberculosis* EC-hisB IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE (EC 4_2_1_19)
 4_2_1_20 6460 *Yersinia pseudotuberculosis* EC-trpA TRYPTOPHAN SYNTHASE ALPHA CHAIN (EC 4_2_1_20)
 4_2_1_28 42 *Salmonella typhimurium*trjO31041 DIOL DEHYDRASE (DIOL DEHYDRATASE) BETA SUBUNIT (EC 4_2_1_28)
 4_2_1_30 44 *Salmonella typhimurium* GLYCEROL DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_30)
 4_2_1_32 2959 *Salmonella typhimurium* ttdA L(+)-TARTRATE DEHYDRATASE ALPHA SUBUNIT (EC 4_2_1_32)
 4_2_1_33 5771 *Yersinia pseudotuberculosis* EC-leuC 3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT (EC 4_2_1_33)
 4_2_1_40 2793 *Salmonella typhimurium* GLUCARATE DEHYDRATASE SUBUNIT (EC 4_2_1_40)
 4_2_1_41 247 *Bacillus subtilis* ycbC 5-DEHYDRO-4-DEOXYGLUCARATE DEHYDRATASE (EC 4_2_1_41)
 4_2_1_42 4594 *Salmonella typhimurium* yhaG D-GALACTARATE DEHYDRATASE (EC 4_2_1_42)
 4_2_1_45 9 *Yersinia pseudotuberculosis* BS-yfmg CDP-GLUCOSE 4,6-DEHYDRATASE (EC 4_2_1_45)
 4_2_1_49 5599 *Yersinia pseudotuberculosis* UROCANATE HYDRATASE (EC 4_2_1_49)
 4_2_1_51 6915 *Yersinia pseudotuberculosis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) / PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 4_2_1_52 5705 *Yersinia pseudotuberculosis* EC-dapA DIHYDRODIPICOLINATE SYNTHASE (EC 4_2_1_52)
 4_2_1_55 3151 *Pseudomonas aeruginosa* PA2767 3-HYDROXBUTYRYL-COA DEHYDRATASE (EC 4_2_1_55)
 4_2_1_6 5846 *Salmonella typhimurium* GALACTONATE DEHYDRATASE (EC 4_2_1_6)
 4_2_1_60 151 *Yersinia pestis* 3-HYDROXYDECANOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_60)
 4_2_1_61 47 *Saccharomyces cerevisiae* FAS1 FATTY ACID SYNTHASE, SUBUNIT BETA (EC 2_3_1_86) [INCLUDES: 3-HYDROXYPALMITOYL-[ACYL-CARRIER-PROTEIN] DEHYDRATASE (EC 4_2_1_61); ENOYL-[ACYL-CARRIER-PROTEIN] REDUCTASE [NADH] (EC 1_3_1_9); [ACYL-CARRIER-PROTEIN] ACETYLTRANSFERASE (EC 2_3_1_38); [ACYL-CARRIER-PROTEIN] MALONYLTRANSFERASE (EC 2_3_1_39); S-ACYL FATTY ACID SYNTHASE THIOESTERASE (EC 3_1_2_14)]
 4_2_1_7 5291 *Yersinia pseudotuberculosis* EC-uxaA ALTRONATE HYDROLASE (EC 4_2_1_7)
 4_2_1_8 4452 *Yersinia pseudotuberculosis* EC-uxuA MANNONATE DEHYDRATASE (EC 4_2_1_8)
 4_2_1_84 560 *Mycobacterium tuberculosis* Rv0106 NITRILE HYDRATASE SUBUNIT BETA (EC 4_2_1_84)
 4_2_1_89 3943 *Salmonella typhimurium* caiB L-CARNITINE DEHYDRATASE (EC 4_2_1_89)
 4_2_1_9 8029 *Yersinia pseudotuberculosis* EC-ilvD DIHYDROXY-ACID DEHYDRATASE (EC 4_2_1_9)
 4_2_1_90 5362 *Escherichia coli* b2247 L-rhamnonate dehydratase (EC 4_2_1_90)
 4_2_2_1 959 *Streptococcus pyogenes* hylA HYALURONATE LYASE PRECURSOR (EC 4_2_2_1)
 4_2_2_10 1863 *Bacillus subtilis* pelB PECTIN LYASE (EC 4_2_2_10)
 4_2_2_2 72 *Yersinia pseudotuberculosis* PERIPLASMIC PECTATE LYASE PRECURSOR (EC 4_2_2_2)
 4_2_2_3 1653 *Pseudomonas aeruginosa* algL ALGINATE LYASE PRECURSOR (EC 4_2_2_3)
 4_2_2_6 3752 *Yersinia pestis* OLIGOGALACTURONATE LYASE (EC 4_2_2_6)

4_2_2_9 7092 *Yersinia pseudotuberculosis* EXOPOLYGALACTURONATE LYASE (EC 4_2_2_9)
 4_2_99_10 1236 *Streptococcus pneumoniae* O-ACETYLHOMOSERINE SULFHYDRYLASE (EC
 4_2_99_10) / O-ACETYL SERINE SULFHYDRYLASE (EC 4_2_99_8)
 4_2_99_11 6467 *Yersinia pseudotuberculosis* EC-yccG METHYLGLYOXAL SYNTHASE (EC 4_2_99_11)
 4_2_99_2 7399 *Yersinia pseudotuberculosis* THREONINE SYNTHASE (EC 4_2_99_2)
 4_2_99_8 5928 *Yersinia pseudotuberculosis* CYSTEINE SYNTHASE A (EC 4_2_99_8)
 4_2_99_9 6531 *Yersinia pseudotuberculosis* EC-metB CYSTATHIONINE GAMMA-SYNTHASE (EC
 4_2_99_9)
 4_3_1_1 6333 *Yersinia pseudotuberculosis* EC-aspa ASPARTATE AMMONIA-LYASE (EC 4_3_1_1)
 4_3_1_12 7087 *Yersinia pseudotuberculosis* ORNITHINE CYCLODEAMINASE (EC 4_3_1_12)
 4_3_1_15 7921 *Bordetella bronchiseptica* PUTATIVE DIAMINOPROPIONATE AMMONIA-LYASE
 (EC 4_3_1_15)
 4_3_1_2 3034 *Bordetella pertussis* METHYLASPARTATE AMMONIA-LYASE (EC 4_3_1_2)
 4_3_1_5 6294 *Salmonella paratyphi* PHENYLALANINE AMMONIA-LYASE (EC 4_3_1_5)
 4_3_1_7 1085 *Salmonella typhimurium* eutC ETHANOLAMINE AMMONIA-LYASE LIGHT CHAIN (EC
 4_3_1_7)
 4_3_99_1 2083 *Pseudomonas aeruginosa* cynS CYANATE LYASE (EC 4_3_99_1)
 4_4_1_11 1209 *Porphyromonas gingivalis* METHIONINE GAMMA-LYASE (EC 4_4_1_11)
 4_4_1_8 4224 *Yersinia pseudotuberculosis* EC-metC CYSTATHIONINE BETA-LYASE (EC 4_4_1_8)
 4_6_1_3 4442 *Yersinia pseudotuberculosis* 3-DEHYDROQUINATE SYNTHASE (EC 4_6_1_3)
 4_6_1_4 7968 *Yersinia pseudotuberculosis* EC-aroC CHORISMATE SYNTHASE (EC 4_6_1_4)
 5_1_1_1 5426 *Yersinia pseudotuberculosis* BS-yncD ALANINE RACEMASE, BIOSYNTHETIC (EC
 5_1_1_1)
 5_1_1_13 6593 *Yersinia pseudotuberculosis* EC-ygeA ASPARTATE RACEMASE (EC 5_1_1_13)
 5_1_1_3 7651 *Yersinia pseudotuberculosis* EC-murl GLUTAMATE RACEMASE (EC 5_1_1_3)
 5_1_1_4 352 *Pseudomonas aeruginosa* PA1268 PROLINE RACEMASE (EC 5_1_1_4)
 5_1_1_7 7986 *Yersinia pseudotuberculosis* EC-dapF DIAMINOPIMELATE EPIMERASE (EC 5_1_1_7)
 5_1_2_2 5250 *Salmonella typhimurium* yfaW MANDELATE RACEMASE (EC 5_1_2_2)
 5_1_2_3 6205 *Yersinia pseudotuberculosis* EC-fadB FATTY OXIDATION COMPLEX ALPHA SUBUNIT
 [INCLUDES: ENOYL-COA HYDRATASE (EC 4_2_1_17) ; DELTA(3)-CIS-DELTA(2)-TRANS-ENOYL-COA
 ISOMERASE (EC 5_3_3_8) ; 3-HYDROXYACYL-COA DEHYDROGENASE (EC 1_1_1_35) ; 3-
 HYDROXYBUTYRYL-COA EPIMERASE (EC 5_1_2_3)]
 5_1_3_13 1391 *Streptococcus pyogenes* cpsFP DTD-4-DEHYDRORHAMNOSE 3,5-EPIMERASE (EC
 5_1_3_13)
 5_1_3_20 7704 *Yersinia pseudotuberculosis* EC-rfaD ADP-L-GLYCERO-D-MANNO-HEPTOSE-6-
 EPIMERASE (EC 5_1_3_20)
 5_1_3_4 6515 *Yersinia pseudotuberculosis* BS-araD L-RIBULOSE-5-PHOSPHATE 4-EPIMERASE (EC
 5_1_3_4)
 5_1_3_6 4833 *Klebsiella pneumoniae* UDP-GLUCURONATE 4-EPIMERASE (EC 5_1_3_6)
 5_1_3_9 4177 *Yersinia pseudotuberculosis* N-acetylmannosamine-6-phosphate 2-epimerase (EC 5_1_3_9)
 5_2_1_1 165 *Bordetella pertussis* MALEATE CIS-TRANS ISOMERASE (EC 5_2_1_1)
 5_2_1_4 5172 *Vibrio cholerae* El Tor NI6961 ORF01738 MALEYLPYRUVATE ISOMERASE (EC 5_2_1_4)
 5_3_1_12 7695 *Yersinia pseudotuberculosis* EC-uxaC URONATE ISOMERASE (EC 5_3_1_12)
 5_3_1_14 7797 *Yersinia pseudotuberculosis* EC-rhaA L-RHAMNOSE ISOMERASE (EC 5_3_1_14)
 5_3_1_16 6123 *Yersinia pseudotuberculosis* EC-hisA PHOSPHORIBOSYLFORMIMINO-5-
 AMINOIMIDAZOLE CARBOXAMIDE RIBOTIDE ISOMERASE (EC 5_3_1_16)
 5_3_1_17 4840 *Yersinia pestis* EC-kduI 4-DEOXY-L-THREO-5-HEXOSULOSE-URONATE KETOL-
 ISOMERASE (EC 5_3_1_17)
 5_3_1_22 7681 *Yersinia pseudotuberculosis* HYDROXYPYRUVATE ISOMERASE (EC 5_3_1_22)
 5_3_1_24 6735 *Yersinia pseudotuberculosis* EC-trpC INDOL-3-GLYCEROL PHOSPHATE SYNTHASE (EC
 4_1_1_48) / N-(5'-PHOSPHO-RIBOSYL)ANTHRANILATE ISOMERASE (EC 5_3_1_24)
 5_3_1_25 1535 *Streptococcus pneumoniae* EC-fucI L-FUCOSE ISOMERASE (EC 5_3_1_25)
 5_3_1_26 974 *Yersinia pestis* GALACTOSE-6-PHOSPHATE ISOMERASE LACB SUBUNIT (EC
 5_3_1_26)
 5_3_1_4 7514 *Yersinia pseudotuberculosis* EC-araA L-ARABINOSE ISOMERASE (EC 5_3_1_4)
 5_3_1_5 6147 *Yersinia pseudotuberculosis* EC-xylA XYLOSE ISOMERASE (EC 5_3_1_5)
 5_3_3_10 3943 *Yersinia pestis* 5-CARBOXYMETHYL-2-HYDROXYMUCONATE DELTA-
 ISOMERASE (EC 5_3_3_10)
 5_3_3_4 311 *Pseudomonas aeruginosa* catC MUCONOLACTONE ISOMERASE (EC 5_3_3_4)
 5_4_1_2 969 *Salmonella typhimurium* cbiC PRECORRIN-8X METHYLMUTASE (EC 5_4_1_2)
 5_4_2_3 5499 *Yersinia pseudotuberculosis* EC-mrsA PHOSPHOGLUCOSAMINE MUTASE (EC 5_4_2_3) /
 PHOSPHOACETYLGLUCOSAMINE MUTASE (EC 5_4_2_3) / PHOSPHOMANNOMUTASE (EC 5_4_2_8)

5_4_2_6 963 *Neisseria gonorrhoeae* BS-yvdM BETA-PHOSPHOGLUCOMUTASE (EC 5_4_2_6)
 5_4_2_7 7525 *Yersinia pseudotuberculosis* EC-deoB PHOSPHOPENTOMUTASE (EC 5_4_2_7)
 5_4_2_9 7116 *Bordetella bronchiseptica* PHOSPHOENOLPYRUVATE PHOSPHOMUTASE
 PRECURSOR (EC 5_4_2_9)
 5_4_3_2 6168 *Yersinia pseudotuberculosis* EC-yjeK L-LYSINE 2,3-AMINOMUTASE (EC 5_4_3_2)
 5_4_3_3 1523 *Porphyromonas gingivalis* D-LYSINE 5,6-AMINOMUTASE BETA SUBUNIT (EC
 5_4_3_3)
 5_4_3_8 6619 *Yersinia pseudotuberculosis* EC-hemL GLUTAMATE-1-SEMIALDEHYDE 2,1-
 AMINOMUTASE (EC 5_4_3_8)
 5_4_99_16 1514 *Salmonella typhimurium* MALTOOLIGOSYLTREHALOSE SYNTHASE (EC
 5_4_99_16)
 5_4_99_5 6915 *Yersinia pseudotuberculosis* EC-pheA CHORISMATE MUTASE (EC 5_4_99_5) /
 PREPHENATE DEHYDRATASE (EC 4_2_1_51)
 5_4_99_6 8095 *Yersinia pseudotuberculosis* EC-menF MENAQUINONE-SPECIFIC ISOCHORISMATE
 SYNTHASE (EC 5_4_99_6)
 5_4_99_9 5269 *Salmonella typhimurium* UDP-GALACTOPYRANOSE MUTASE (EC 5_4_99_9)
 5_5_1_1 310 *Pseudomonas aeruginosa* catB MUCONATE CYCLOISOMERASE (EC 5_5_1_1)
 5_5_1_2 2128 *Pseudomonas aeruginosa* pcaB 3-CARBOXY-CIS,CIS-MUCONATE CYCLOISOMERASE
 (EC 5_5_1_2)
 5_5_1_5 7814 *Yersinia pseudotuberculosis* EC-ybhE CARBOXY-CIS,CIS-MUCONATE CYCLASE (EC
 5_5_1_5)
 5_5_1_7 7476 *Yersinia pseudotuberculosis* BS-ykfB CHLOROMUCONATE CYCLOISOMERASE (EC
 5_5_1_7)
 6_2_1_12 8479 *Pseudomonas aeruginosa* PA3860 4-COUMARATE--COA LIGASE 2 (EC 6_2_1_12)
 6_2_1_14 6490 *Yersinia pseudotuberculosis* 6-CARBOXYHEXANOATE--COA LIGASE (EC 6_2_1_14)
 6_2_1_17 5165 *Vibrio cholerae* El Tor N16961 ORF01729 propionate--CoA ligase (EC 6_2_1_17)
 6_2_1_21 1358 *Escherichia coli* b1398 phenylacetate--CoA ligase (EC 6_2_1_21)
 6_2_1_22 4651 *Vibrio cholerae* El Tor N16961 ORF01068 [CITRATE (PRO-3S) -LYASE] LIGASE (EC
 6_2_1_22)
 6_2_1_25 538 *Mycobacterium tuberculosis* fadD22 BENZOATE-COENZYME A LIGASE (EC 6_2_1_25)
 6_2_1_26 8100 *Yersinia pseudotuberculosis* EC-menE O-SUCCINYLBENZOIC ACID--COA LIGASE (EC
 6_2_1_26)
 6_2_1_5 5649 *Yersinia pseudotuberculosis* EC-sucC SUCCINYL-COA SYNTHETASE BETA CHAIN (EC
 6_2_1_5)
 6_2_1_6 4151 *Pseudomonas aeruginosa* PA1188 GLUTARATE--COA LIGASE (EC 6_2_1_6)
 6_2_1_8 5444 *Escherichia coli* b2371 FORMATE--COA LIGASE (EC 6_2_1_8)
 6_3_1_1 5949 *Yersinia pseudotuberculosis* EC-asnA ASPARTATE--AMMONIA LIGASE (EC 6_3_1_1)
 6_3_1_8 6658 *Salmonella typhimurium* gsp BIFUNCTIONAL GLUTATHIONYLSPERMIDINE
 SYNTHETASE/AMIDASE [INCLUDES: GLUTATHIONYLSPERMIDINE SYNTHASE (EC 6_3_1_8) /
 GLUTATHIONYLSPERMIDINE AMIDASE (EC 3_5_1_78)]
 6_3_2_1 7187 *Yersinia pseudotuberculosis* EC-panC PANTOATE--BETA-ALANINE LIGASE (EC 6_3_2_1)
 6_3_2_12 5479 *Yersinia pseudotuberculosis* FOLYLPOLYGLUTAMATE SYNTHASE (EC 6_3_2_17) /
 DIHYDROFOLATE SYNTHASE (EC 6_3_2_12)
 6_3_2_13 5376 *Yersinia pseudotuberculosis* EC-murE UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE (EC 6_3_2_13)
 6_3_2_15 5375 *Yersinia pseudotuberculosis* EC-murF UDP-N-ACETYLMURAMOYLALANYL-D-
 GLUTAMYL-2,6-DIAMINOPIMELATE--D-ALANYL-D-ALANYL LIGASE (EC 6_3_2_15)
 6_3_2_4 7935 *Yersinia pseudotuberculosis* EC-ddIB D-ALANINE--D-ALANINE LIGASE (EC 6_3_2_4)
 6_3_2_5 6572 *Yersinia pseudotuberculosis* BS-ylol PHOSPHOPANTOTHENATE--CYSTEINE LIGASE (EC
 6_3_2_5) / PHOSPHOPANTOTHENOYL-CYSTEINE DECARBOXYLASE (EC 4_1_1_36)
 6_3_2_8 7936 *Yersinia pseudotuberculosis* EC-murC UDP-N-ACETYLMURAMATE--ALANINE LIGASE
 (EC 6_3_2_8)
 6_3_2_9 7939 *Yersinia pseudotuberculosis* EC-murD UDP-N-ACETYLMURAMOYLALANINE--D-
 GLUTAMATE LIGASE (EC 6_3_2_9)
 6_3_3_3 4728 *Yersinia pseudotuberculosis* DETHIOBIOTIN SYNTHETASE (EC 6_3_3_3)
 6_3_4_6 4285 *Yersinia pseudotuberculosis* BS-ycsJ UREA CARBOXYLASE (EC 6_3_4_6) /
 ALLOPHANATE HYDROLASE (EC 3_5_1_54)

Figure 8

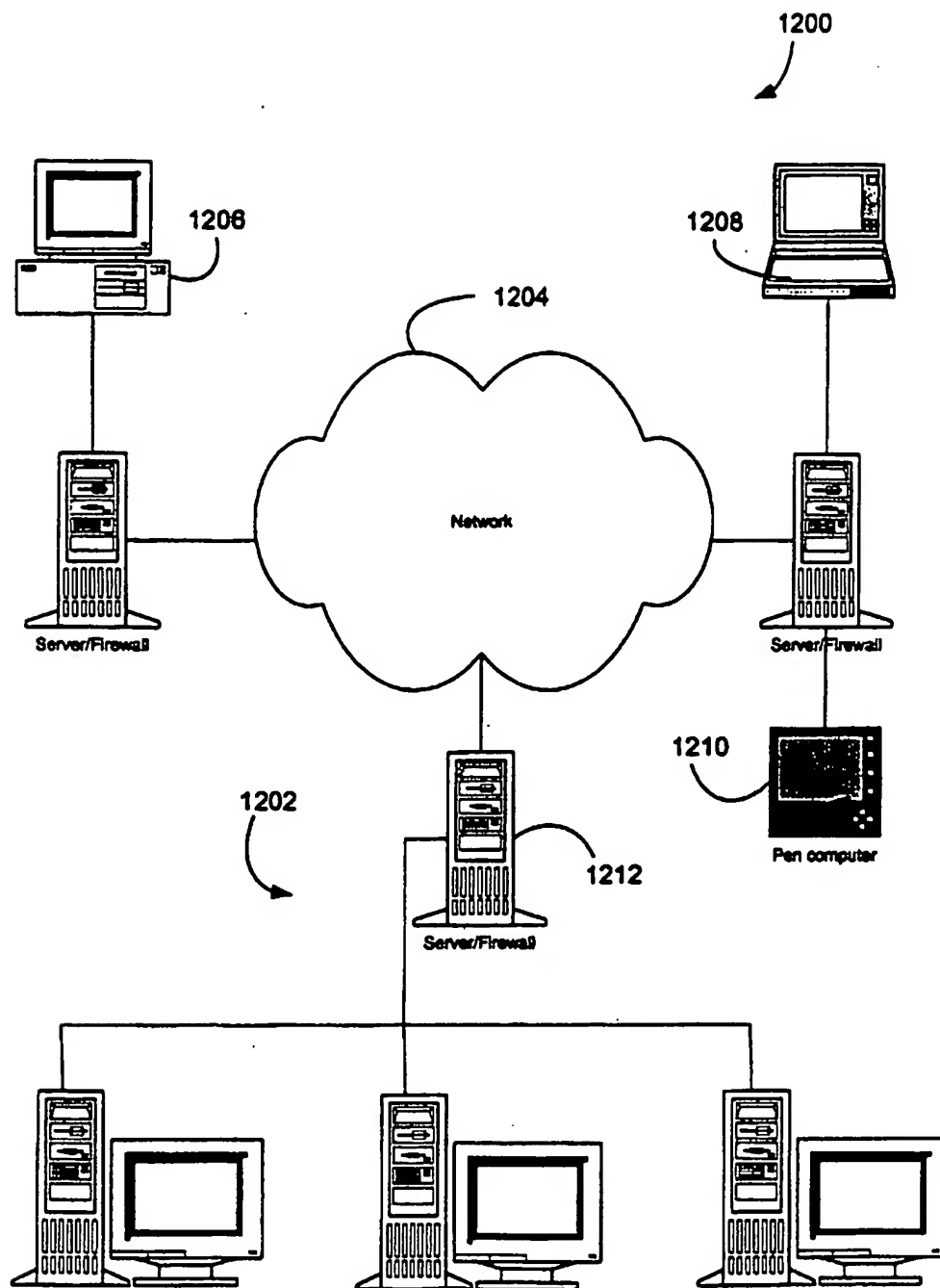


Figure 9

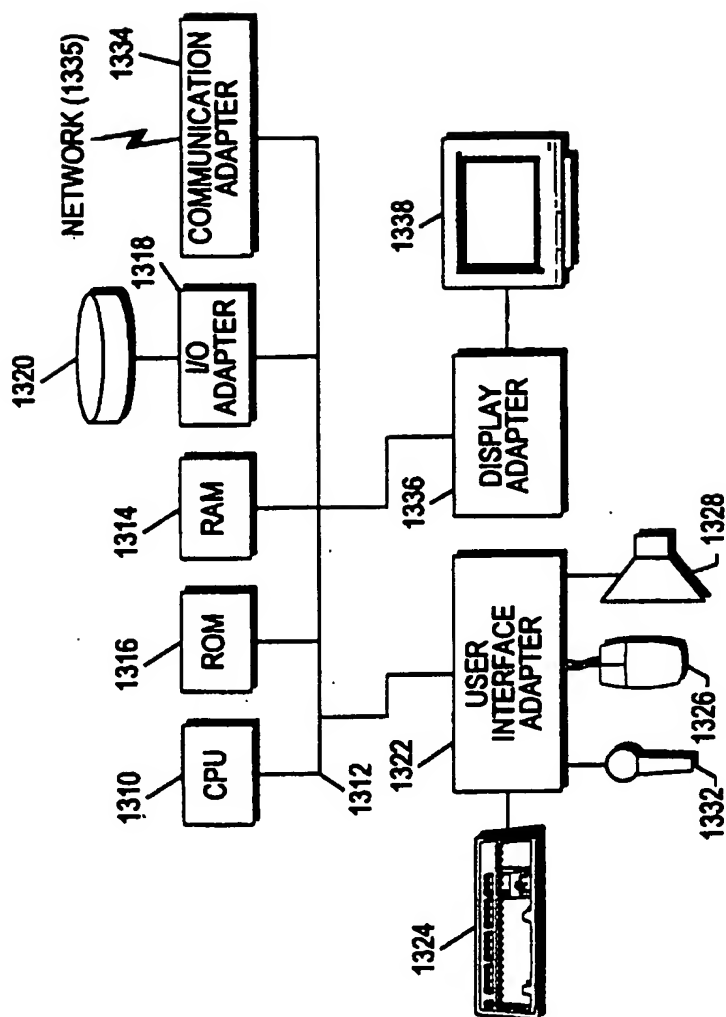
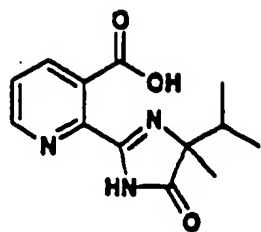
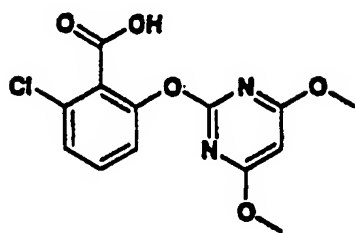
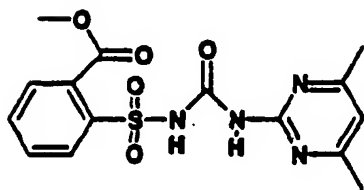
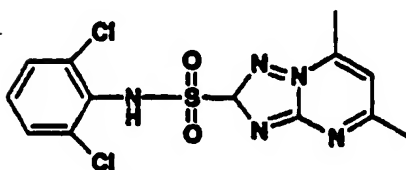
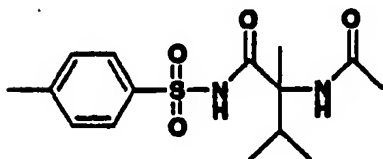
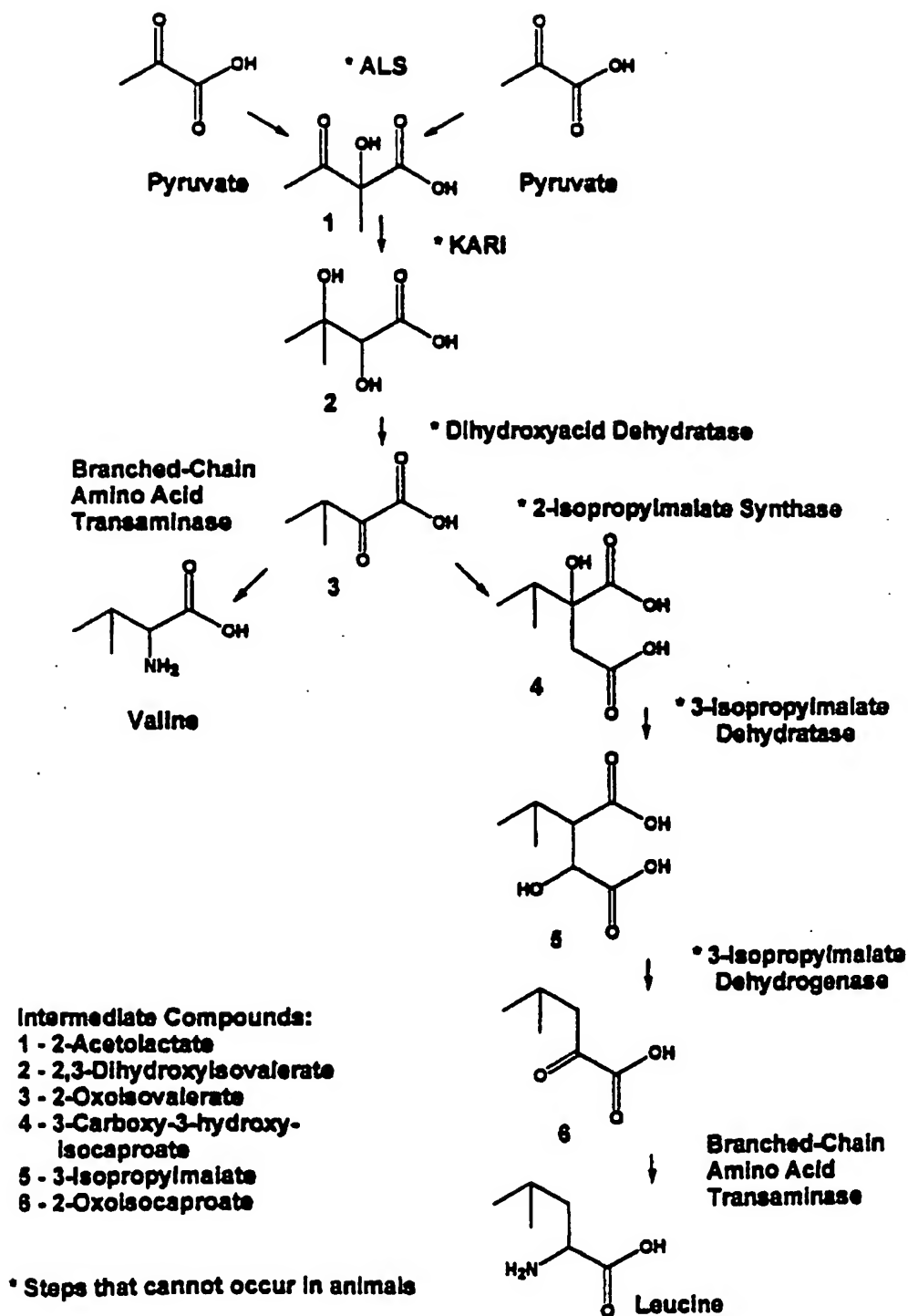


Figure 10**Imidazolinone****Pyrimidyl-oxy-benzoic acid****Sulfonylurea****Triazolopyrimidine****Sulfonylcarboxamide**

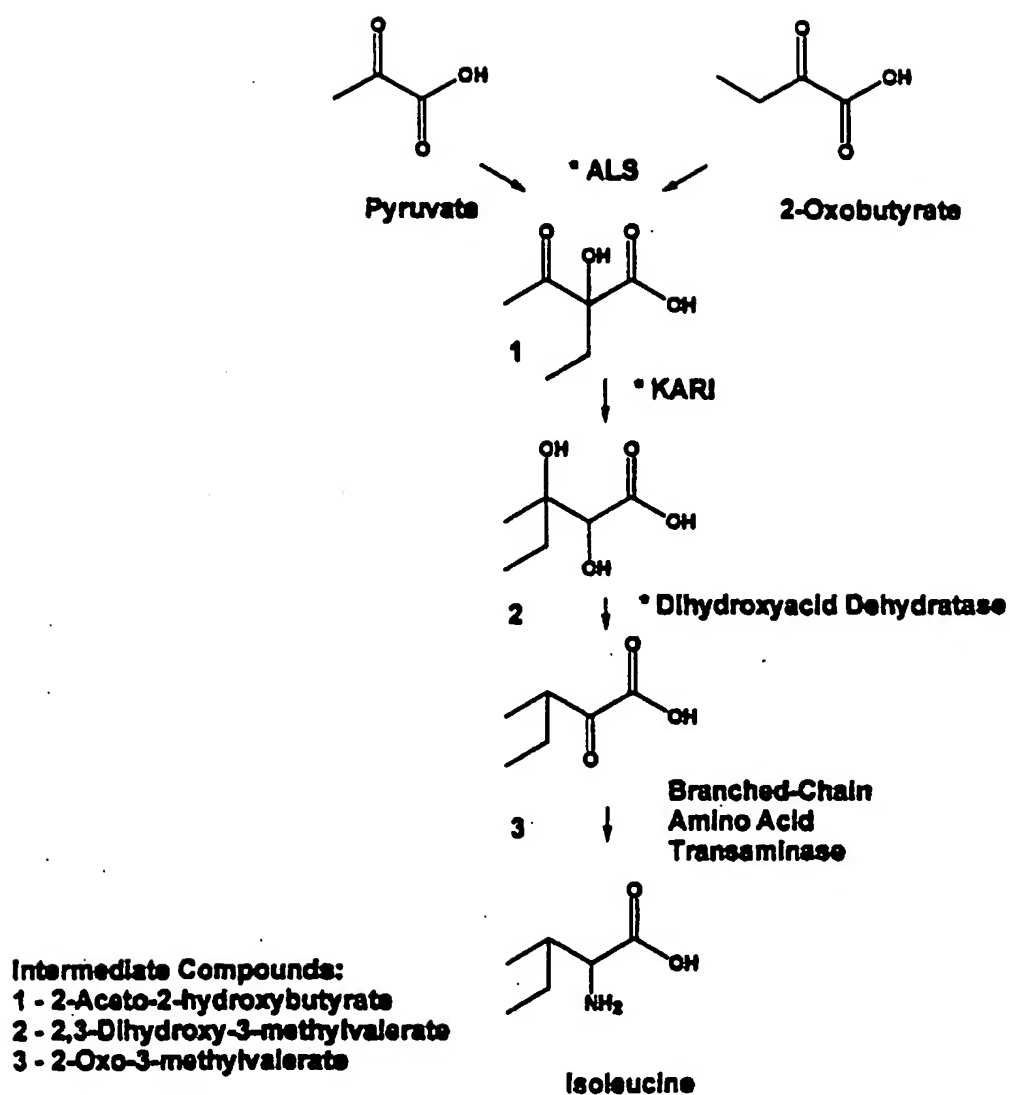
Compounds representing different chemical classes of AcLS inhibitors, and which are currently used as herbicides.

Figure 11



Branched-chain amino acid pathway. Synthesis of Valine and Leucine.

Figure 12



*Enzyme activities not described in humans

Branched-chain amino acid pathway. Synthesis of Isoleucine.